VOL. 172, NO. 1 AMERICAN JANUARY, 1950

Gas Journal

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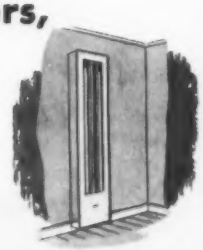
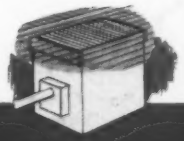
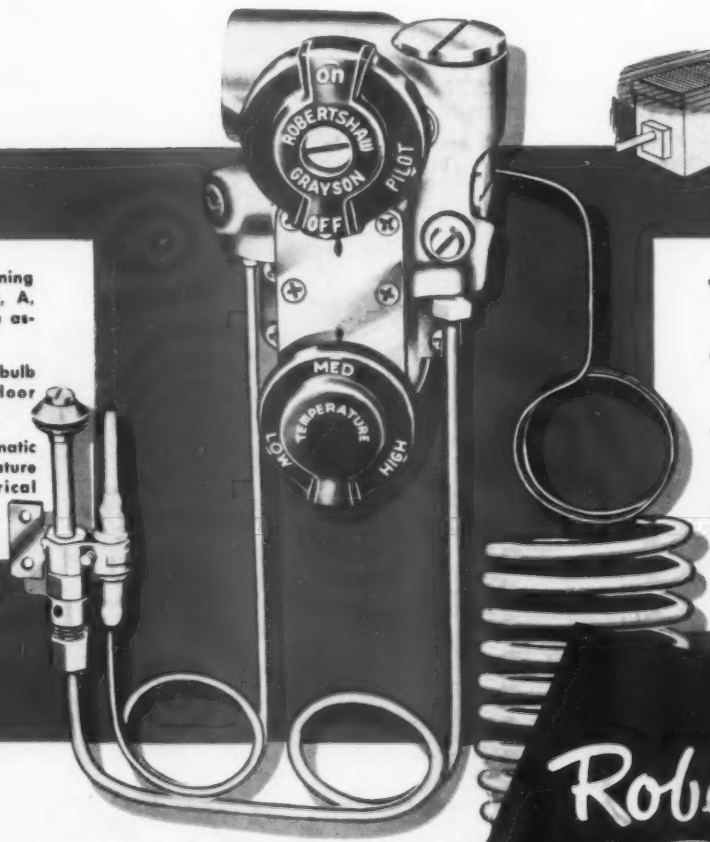
ROBERTSHAW UNITROL GRAYSON

For automatic temperature regulation of homes heated by gas fired floor furnaces, single and double wall heaters, console heaters and combination ranges







- A packaged unit combining thermostat, safety pilot, A, B and C controls in one assembly.
- Installed with sensitive bulb in cold air return of floor furnace or space heater.
- Provides accurate automatic control of room temperature without outside electrical connections.

- 100% shut off of both pilot and main burner plus snap-action thermostatic control.
- Safe lighting — during pilot lighting operations gas cannot flow to main burner.
- Thermo-magnetic type automatic pilot—no moving parts in combustion chamber.
- Flexible capillary tubing makes installation simple, permits location of thermostat in most effective position.

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CONTROLS COMPANY
GREENSBURG, PENNSYLVANIA

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PRESSED STEEL METERS

for Natural, Manufactured and LP-Gas

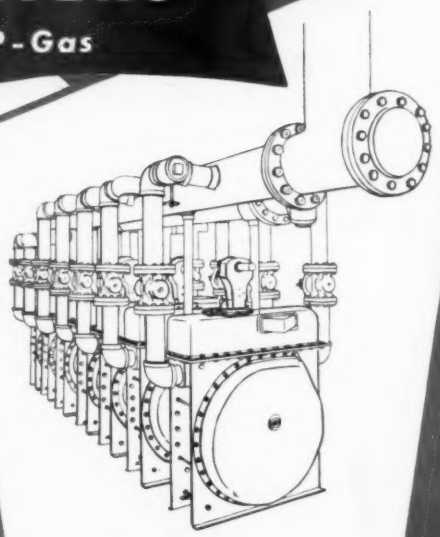
TALL and SLENDER

You can fit them into tight places

Any distribution man who has tried stretching floor space to accommodate large capacity meters will appreciate the Emco pressed steel design. Like a skyscraper in a congested city these meters tower upward to conserve ground area. They are built like a skyscraper, too, around a reinforced, all-welded frame.

The narrow width of Emco No. 4½ and 5 meters is particularly advantageous when manifolding a bank of meters to handle extra large loads. Other advantages include repair ease, a high degree of accuracy and comparatively light weight.

Bulletin No. 1033 describes all features in detail. Write for it today.



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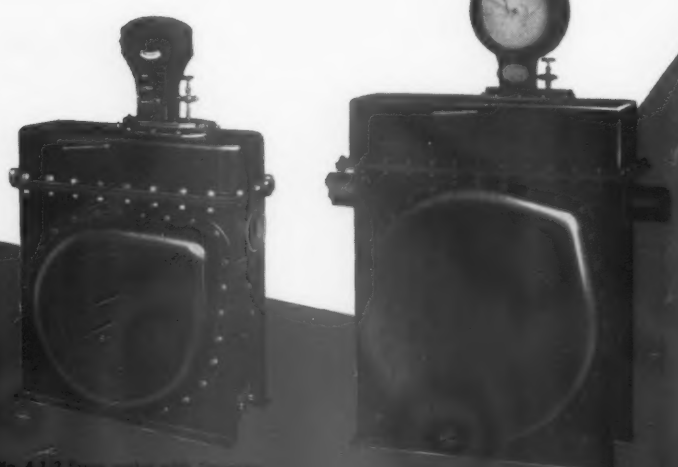

Emco No. 4 1/2 meter with main cover and side plates removed. Note the large area diaphragms, "in-line" valves and full accessibility to all working parts.

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Aluminum Meters

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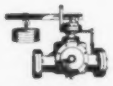
"1001" Regulators

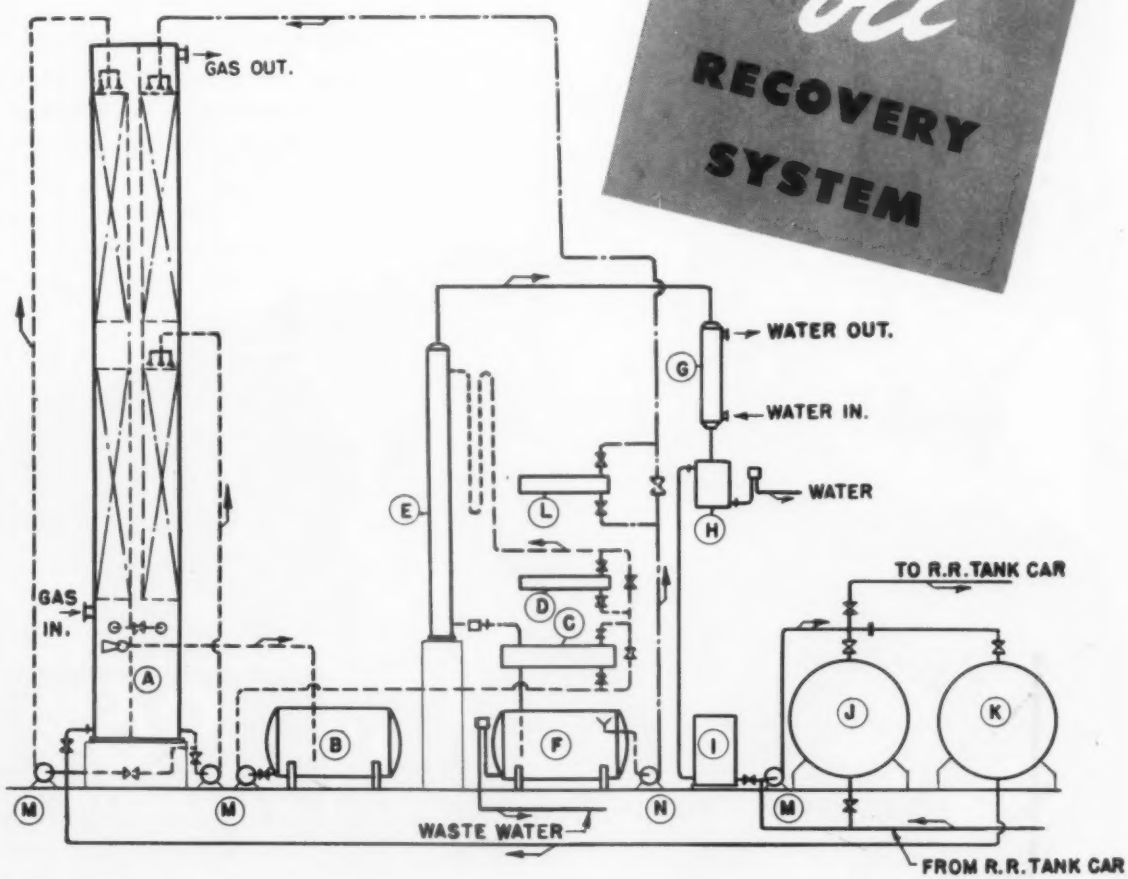

Balanced Valve Regulators

...thinking about *Oil gas?*

then you'll need this...

Light oil RECOVERY SYSTEM

Remove the condensables in your plant instead of in your distribution system.



LEGEND

A—Scrubber
B—Enriched Oil Pump Tank
C—Oil to Oil Heat Exchanger
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M—Absorption Oil Circ. Pump
N—Stripped Oil Circ. Pump

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ALLIED CHEMICAL & DYE CORPORATION

AMERICAN GAS JOURNAL, January, 1950. Vol. 172, No. 1. Published monthly by American Gas Journal, at 73 Main Street, Brattleboro, Vt. Executive and Editorial offices at 205 East 42nd Street, New York 17, N. Y. Entered as second class matter October 7, 1928, at the post office at East Stroudsburg, Pa., under the Act of March 3, 1879. Application pending for transferal of second class mailing privileges to the post office at Brattleboro, Vt. Printed in U.S.A.

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The Cast Iron Pipe Century Club is probably the most unique club in the world. Membership is limited to municipal, or privately-owned, gas and water supply systems having cast iron mains in service for a century or more.

Although the Club is formally established, there are no dues, no regular meetings, and no obligations other than to inform the Recording Secretary if and

96%

OF ALL 6-INCH AND LARGER CAST IRON WATER MAINS EVER LAID IN 25 REPRESENTATIVE CITIES ARE STILL IN SERVICE.

Based on the findings of a survey conducted by leading water works engineers.

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DISTINGUISHED CLUB...
29 Members!

when the qualifying gas or water main is taken out of service, or, sold for re-use.

In spite of the unique requirement for membership, the Club roster grows, year by year. And why not, when answers to a questionnaire, mailed to gas officials in 43 large cities, show that *original* cast iron mains are still in service in 29 of the cities. And a survey sponsored by three water works associations, indicates that 96% of all 6-inch and larger cast iron water mains ever laid in 25 representative cities are still in service.

If your records show a cast iron main in service, laid a century or more ago, the Club invites you to send for a handsome framed Certificate of Honorary Membership. Address Thomas F. Wolfe, Recording Secretary, Cast Iron Pipe Century Club, Peoples Gas Bldg., Chicago 3, Illinois.

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Wait till you see the *sensational new* Servel for '50! With a *truly classic exterior*—Servel is styled to stay modern . . . never to "date" a kitchen. With a new *quick-change* interior—it takes just seconds to switch shelf arrangements for special needs. *And* . . . Servel will be promoted by the most *dramatic, aggressive* advertising in refrigerator history . . . planned and placed *to sell you out of Servels in '50!*

SERVEL sell-bent for '50

AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 172 JANUARY 1950 NUMBER 1

This month...

Feeling that we should greet the New Year with something more enduring than a monumental headache and a bale of good resolutions to be promptly filed and forgotten, we are introducing with this January 1950 issue of AMERICAN GAS JOURNAL, new type faces for both text and headline material. The body type is known as Times Roman, and was developed specifically to give a face that would allow more words to the page, without sacrificing readability. Making material readable, and making it worth reading, are rather widely removed aspects of the publishing problem. We wish the latter could be solved as easily as picking out a new font of type.

It is a pleasure to add the name of Arthur Rohman to our masthead as Western Editor. A stimulating personal and business association of many years standing has always served to strengthen our impression that Mr. Rohman is one of the most competent journalists in the trade publication field. His ability exercised in behalf of AMERICAN GAS JOURNAL should go far toward enabling us to give the West the type of coverage that it so richly deserves.

It is not our policy to go off the deep end for a process that is still in the pilot plant stage. But The Gas Machinery Company's new continuous gas generator seems to show such promise that we are giving it top billing this month, in the article on page 8 by Huxley Madeheim. It leads us to speculate also on whether the introduction of a generator of this type, with its wide range of flexibility in feed stocks and make gas, might not be a step toward an ultimate standardization of Btu content and specific gravity for a large segment of the gas industry.

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Elliott Taylor · Editor

Howard F. Weeks · Associate Editor

Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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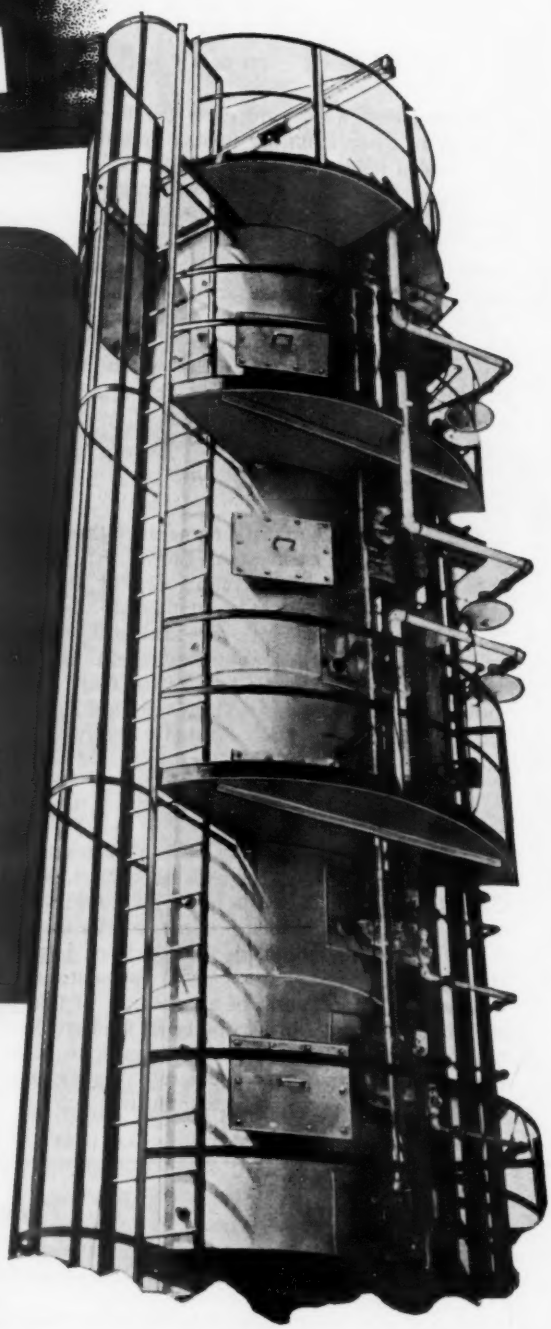
CONTINUOUS GAS GENERATION

In the reforming of hydrocarbons—thermally and catalytically—the higher the temperature, the more rapid and more complete the reactions. RESULT: Greater capacity per unit of equipment.

- Reactor Tubes in the GASMACO Apparatus are Constructed of Silicon Carbide, Tested for 3000°F.
- More Capacity per Dollar Invested.
- Elimination of the Cyclic Process.
- Close Temperature Control.
- Feed Stocks—Natural Gas, LPG, Gasoline, Light Oil.
- Available with Waste Heat Boiler or Recuperator.

After more than three years of study and experimentation, The Gas Machinery Company has accumulated data relating to various process feeds and finished products. This data is available to members of the gas industry who are interested.



Experimental plant constructed by GASMACO on its property in Cleveland. Built for research and for demonstration of processes to the gas industry.

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Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces

Editorial:

Dream's End

THE incredible lack of vision of the United Mine Workers, and the stormy petrel who leads them, was etched in gloomy outline when Pittsburgh Consolidation Coal Co., the world's largest producer, announced that on January 6 the large gasification pilot plant, which had been running continuously for over a year, would close.

The plant, operating on a joint research agreement with Standard Oil Development Co., had been experimenting in the production of gas suitable for syntheses into oils and gasoline. Included in the program was the making of producer gas in air-blown operation; and the whole undertaking was part of a program announced in 1945 to get more coal "into pipes and wires." Enough data had already been gathered to warrant the hope that a commercial pilot plant might prove economically and financially justifiable. For the moment, at least, this next step in the investigations is halted. Greatly increased world supplies of petroleum have been a factor; but the high cost of coal and the erratic production schedule of two or three work days per week in the mines dealt the final *coup de grace* to the scheme.

George H. Love, President of the coal company, summed it up by saying: "No sane person would dream of investing great sums of money in a venture which was tied to coal as a raw material when the future cost is so indefinite and the supply of coal so unreliable."

We wonder how long sane men in the United Mine Workers will continue to invest in the leadership that has already priced solid fuel out of the market wherever a substitute can be found, and that now seems bent on destroying the basic research on which their industry and their very jobs so desperately depend.

Timely Warning

TO protect its customers against the gyp artists and shysters that swarm into any community when conversion to natural gas is undertaken, the Milwaukee Gas Light Co. has taken large display space in the daily papers to warn the public against the shady practices that might be anticipated in light of the experience of gas companies in other areas.

Reprinting the text of a report from the Better Business Bureau of Milwaukee, the gas company publicizes the fact that in St. Louis, after conversion to straight natural gas had been announced, the Better Business Bureau "in five months received 1,300 complaints and inquiries and the gas company more than 30,000 applications for service."

Complaints ran all the way from faulty installation of equipment to outright fraud in selling it. Other fast practices that Milwaukee gas consumers are warned to look out for include: Offering of unknown, unbranded and shoddy goods; representation on the part of salesmen that they could arrange with the gas company to get the customer a priority in conversion or installation; the sale of cast iron tops for gas ranges (a sure-fire carbon monoxide threat); and exhorbitant prices for minor jobs.

The Milwaukee Gas Light Co. has a system of Registered Dealers in Natural Gas House Heating. These dealers are investigated by the company as to both their reliability and their technique in installation practices. In its advertising the gas company identifies these dealers as (1) Selling house heating equipment approved or listed by the American Gas Association and (2) Having the installation know-how to assure satisfactory performance.

By bringing this unpleasant subject into the open, and by anticipating trouble while much of it can still be avoided, the Milwaukee Gas Light Co. is making a distinct contribution to business ethics, as well as investing in the continued good will of its consuming public.

Powerful Partners

EVERY operating gas man, and every executive of a manufactured gas company now contemplating the problem of what to do with natural gas when it becomes available to his system for the first time, owes it to himself to read the booklet from which we have baldly plagiarized the caption of this editorial, "Powerful Partners, Manufactured and Natural Gas."

The work is a factual discussion of gas supply and demand problems, as viewed by the Koppers Company, Pittsburg. And while, as would naturally be expected, it presents a strong brief for a mixed gas operation, it substantiates its contentions by a sagacious analysis of the immediate and long term investment problem.

It would be unfair to the producers of this study to dilute its obvious interest and value by cursory comment on its entire contents. From our own particular viewpoint we feel that it unduly stresses the contention that natural gas supplies are in danger of running out at any time within the foreseeable future. It is both mathematically unsound and logically untenable to imply that the end or decline of natural gas supplies will occur in 25 or 30 years, when every year the estimated recoverable reserves exceed those of the year before.

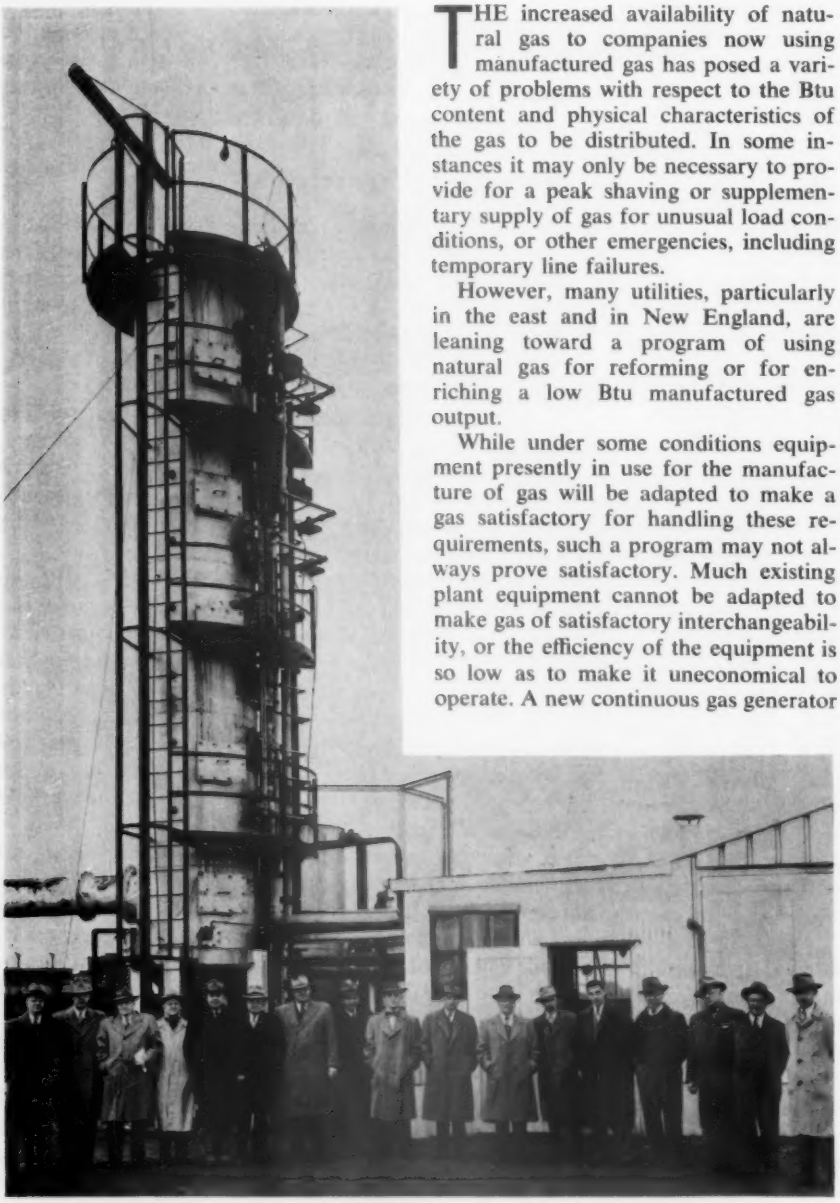
Yet it cannot be denied that where gas producing investment is discarded for natural gas, it will be the distributing utility's responsibility to reinstate that equipment when and if it becomes necessary. The question is, in terms of cost of gas in the holder, what present equipment is worth retaining, rehabilitating or converting. This is essentially a local problem, with the condition and efficiency of the local facilities, as well as the cost of gas from pipe lines, the principal factors to be considered.

Whether the industry in the main, agrees with its findings or not, the Koppers survey, "Powerful Partners," is a realistic contribution to the consideration of the most pressing problem facing a large segement of the manufactured gas industry.

Elliott Taylor

Continuous Gas Generator Shows Promise In Base Load and Standby Operations

by Huxley Madeheim
Engineer, New York, N. Y.



A recent inspection tour of the new continuous gas process: From left to right: E. J. Baechle, Cincinnati; K. W. Stookey, Cleveland; Frank Leckie, Detroit; R. V. McKay, Dubuque; A. C. Rathkey, Waterloo; A. I. Rawson, Cincinnati; L. F. McConnell, Birmingham; G. J. McKinnon, Detroit; O. B. Holman, Philadelphia; M. F. Sample, Erie; H. E. Merrill, Buffalo; N. G. Stultz, Brockton; A. M. Cunningham and A. W. Krause, Cleveland; Elliott Taylor, New York; W. E. Steinwedell and R. D. Jolls, Cleveland.

THE increased availability of natural gas to companies now using manufactured gas has posed a variety of problems with respect to the Btu content and physical characteristics of the gas to be distributed. In some instances it may only be necessary to provide for a peak shaving or supplementary supply of gas for unusual load conditions, or other emergencies, including temporary line failures.

However, many utilities, particularly in the east and in New England, are leaning toward a program of using natural gas for reforming or for enriching a low Btu manufactured gas output.

While under some conditions equipment presently in use for the manufacture of gas will be adapted to make a gas satisfactory for handling these requirements, such a program may not always prove satisfactory. Much existing plant equipment cannot be adapted to make gas of satisfactory interchangeability, or the efficiency of the equipment is so low as to make it uneconomical to operate. A new continuous gas generator developed by the Gas Machinery Co., of Cleveland, which uses silicon carbide tubes approximately 28 feet long for cracking hydrocarbons is being advanced as a very satisfactory answer to the problem of interchangeability in peak or standby gas making, as well as reforming natural gas for above load operation. Extensive experimental operation appears to show that this generator will provide for peak load gas requirements, allowing for great flexibility with respect to raw material handled, and show a resultant wide range of possible end products. Where flame characteristics require a hydrogen rich gas, this generator will also be of service. The equipment is expected to find many uses in other fields, particularly the chemical, where gases for chemical synthesis and processing are required.

Its specific applications to the gas industry are described as: (1) Reforming natural gas, or in some cases propane or gasoline as a base load operation; (2) Peak shaving for natural or manufactured gas, combined with the base load or (3) Standby for any type of natural or manufactured gas. See Table I.

The designers of the set feel that in developing this generator, using long silicon carbide tubes, they have met the requirements for a successful continuous process of cracking hydrocarbons for both the gas and chemical industries.

The gas generator consists of a vertical cylindrical furnace which is a steel shell lined and insulated with brick. (See isometric drawing on page 10.) The furnace is heated with a multiplicity of dual fuel burners using either gas or oil, and subject to control by zones, so that different temperatures may be secured at different points in the furnace if desired. The actual cracking of the hydrocarbons, liquid or gaseous, is accomplished in silicon carbide—four inch inside diameter tubes running the length of the furnace. The tubes normally contain a catalyst, Raschig ring shapes being used at present. In the experimental model three tubes are used. By increasing the number but not the diameter or length of these tubes—generators of

varying output capacities may be constructed. The generator in the set shown has tubes 28 ft. long. The shell is five ft. in diameter, and provided under test approximately 20 Mcf per hour. By control of the temperatures in the various zones, control of the pressure in the tubes and by varying the hydrocarbon constituents as well as the amount of steam and air admitted with the feed, the gaseous products resulting may be changed with respect to Btu content, specific gravity and per cent by volume of the ultimate constituent gases.

Together with the generator, a condenser or cooling scrubber, exhauster, and metering devices are provided. A relief holder may be provided where required but since the process is continuous a holder would usually seem to be unnecessary except in special circumstances. While so far in the cracking of gasolines and light oils only a trace of tar vapor has been produced, it is possible that where exceptional purity is essential or where heavier feed material is used, that it may be desirable to add a tar and liquor separator or tar extractor to the plant.

In this generator the most important development is the successful use of silicon carbide tubes in long lengths. While the use of silicon carbide tubes in short lengths is not new, as witness their use in Fitch recuperators, the successful use of the longer length tube at very high temperatures is the result of research and development by the Gas Machinery Co.

The company, in designing heat treating furnaces with controlled atmos-

Table 1—Some Uses of Gasmaco Continuous Gas Process

Process Feed	Fuel	End Product	Utilization
Natural Gas	Natural Gas	Reformed Natural Gas (carrier gas)	Enriched and/or blended for distribution
Natural Gas	Oil	Reformed Natural Gas (carrier gas)	Enriched and/or blended for distribution
Propane*	Oil	Reformed Propane (carrier gas)	Enriched and/or blended for low Btu distribution
Propane*	Oil	Reformed Propane (carrier gas)	Enriched and/or blended for high Btu distribution (suitable natural gas or mixed gas substitute)
Gasoline†	Oil	Carrier Gas	Enriched and/or blended for distribution, low or high Btu.
Gasoline†	Oil	Finished Gas	Direct Distribution, low or high Btu.
Gas Oil	Oil	Finished Gas	Direct Distribution, low or high Btu.

* Propane may be commercial propane obtained from either natural gas or refinery sources.
† Gasoline may be either casinghead (natural gas source) or straight run gasoline (petroleum source).

Table 2—Sample Analyses of Various Catalytic and Thermal Reformed Hydrocarbons Produced in the Gasmaco Continuous Gas Process

	Reformed Natural Gas (Carrier Gas-High Sp. Gr.)†	Reformed Natural Gas, Enriched with 32.6% Nat. Gas (High Sp. Gr.)§	Reformed Natural Gas (Carrier Gas-Low Sp. Gr.)	Reformed Natural Gas, Enriched with 21% Nat. Gas (Low Sp. Gr.)§	Reformed Gasoline (Straight Run)	Reformed Gasoline (Straight Run)	Reformed Gasoline (Straight Run)	Reformed Light Oil (That is: Oil Gas)	Natural Gas Used for Enriching
Heating Value (Observed)	289		400		355	530	1000	1045	1045
Heating Value (Calculated)	287	535	395	535	336	545	*978	*1092	
Sp. Gr. (Observed)	0.60		0.35		0.60	0.62	0.88	0.62	0.64
Sp. Gr. (Calculated)	0.56	0.61	0.34	0.41	0.56	0.60	0.85	0.61	
Per Cent By Volume									
CO_2	0.8	0.7	1.6	1.4	2.4	1.8	0.6	1.0	0.7
Illuminants	0.8	0.5	0.1	0.1	3.8	12.8	30.4	24.6	0.2
O_2	0.2	0.2	0.4	0.4	0.6	0.2	2.3	0.2	
H_2	42.1	28.4	64.5	51.0	43.4	37.6	14.7	29.2	
CO	15.1	10.2	18.4	14.5	19.8	13.1	7.4	0.8	
CH_4	9.1	33.3	12.9	27.7	7.5	14.5	22.0	44.2	83.5
C_2H_6		3.5		2.2					10.6
C_3H_8		0.3		0.2					0.9
C_4H_{10}		0.1							0.2
N_2	31.9	22.8	2.1	2.5	22.5	20.0	22.6		3.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* In all cases other than these two, the calculated heating value was determined by using a heat content of 1900 Btu per cu. ft. for illuminants. For these two cases, a value of 2300 Btu per cu. ft. was used.
† Analysis of a reformed propane or butane carrier gas is not shown since it will be very similar to reformed natural gas. A reformed propane carrier gas enriched with propane to 535 Btu will, of course, have propane in its finished gas, about 7-15%, depending on the heating value of the carrier gas.
§ The finished enriched reformed natural gas with low sp. gr. may be used for or with coke oven or coal gas whereas the high sp. gr. finished gas mixture may be used for or with carburetted gas.

GASMACO CONTINUOUS GAS PROCESS
SCHEMATIC DRAWING ILLUSTRATING MAJOR EQUIPMENT and FLOW
patent pending
Isometric Layout Prepared by
Huntley Mackenzie Eng
New York Dec 1949
GASEOUS HYDROCARBON FEED such as NATURAL GAS, PROPANE, BUTANE, etc.
METER
PROCESS LIQUID FEED
METER
STEAM IN
STEAM OUT
LIQUID HYDROCARBON FEED such as GASOLINE, LIGHT OIL, etc.
HEAT EXCHANGER
FROM LIGHT or HEAVY OIL SUPPLY SYSTEM
METER
FUEL OIL
GAS REGULATOR
FUEL NATURAL GAS
GAS GENERATOR
PROCESS STEAM from WASTE HEAT BOILER or PACKAGE BOILER
TEMPERATURE CONTROLS TO COMBUSTION AIR CONTROL VALVE
COMBUSTION FLUE PRODUCTS to WASTE HEAT BOILER or HEAT EXCHANGER for PREHEATING PROCESS FEEDS, etc.
MAIN COMBUSTION AIR for LIQUID FUEL BURNERS
SILICON CARBIDE TUBES
CATALYST
SEAL
WATER OUT
PROCESS AIR ORIFICE METER
ATOMIZING AIR for FUEL BURNERS
CONDENSER
WATER IN
GAS MAKE METER
AIR BLOWER
PRODUCT GAS for DIRECT DISTRIBUTION, BLENDING or FURTHER PROCESSING

pheres, required a radiant heating tube design where the fuel was burned inside the tube. The maximum length of silicon carbide tubes commercially available was 68 inches. Since longer lengths were essential in the design the company perfected a method of joining the tubes together. In the new generator the tubes are fitted with ball and socket joints which are customarily sealed with a high temperature sealing salt. However, due to the design of these joints it has been found that satisfactory operation is possible even without the sealing material. The ball and socket joints also allow for lateral deflection of the tubes which thus compensates for expansion and any tendency towards buckling due to unequal expansion. The manufacturers feel that sufficient operating data on the experimental set have been accumulated to prove that the new gas generator has certain distinct advantages. These include:

Lower investment, operating, maintenance and repair costs.

Flexibility in operating temperatures, thus permitting a wide range in raw materials for feed stocks.

Continuous, non-cyclic operation at high temperatures with consequent more rapid and complete reactions.

Semi-automatic operation, requiring a minimum of operator attention.

The lower investment costs, operating costs, maintenance and repair costs all stem from the successful use of silicon carbide tubes in long lengths. The only feasible substitute for silicon carbide tubes is alloy steel which costs three to four times as much as the silicon carbide and has shorter life.

The wide range of raw materials and finished products results from the continuous operation at extremely high temperatures, made possible through the development of the long silicon carbide tubes. In operation the experimental set has run at temperatures ranging from 1800°F to 2400°F, and it is believed that no difficulty will be encountered in operating at 3000°F or above, should that be necessary. Gas Machinery engineers have stated that their next runs will be stepped up to 3000°F to prove this contention.

By adjusting the controls, the same generator set can be used to turn out a wide range of end products using a variety of feed stock so that full advantage of different product requirements and relative availability of raw materials may be realized.

Besides the potential value of this equipment in the chemical industries for cracking to produce gaseous materials for further processing, it is of primary interest to the gas industry because of its ability to furnish gas of whatever heat content and specific gravity may be necessary, using readily available fuels in order to meet peak load problems, or to permit of reforming wherever and whenever that is most desirable.

With the growing realization on the part of public service commissions that some equitable means must be found of allowing gas utilities to retire their manufactured gas equipment without undue hardship when converting to natural gas, a serious rate base dilemma is being solved. Utilities may no longer find it necessary to justify retention of obsolete manufactured gas equipment on the books by using it in connection with the reforming of natural gas. With the artificial quasi-legal reasons for the use of old equipment removed, it becomes impossible to justify the operation of the old equipment on economical grounds for handling the peak load problems where the cost of operation and limited flexibility of raw material and finished product cannot compare with new methods of generating.

In support of its contention that lower labor costs will be achieved, the company claims that a set producing 500,000 cu. ft. per hour of make gas can be operated by two men with highest overall efficiency.

In the previous discussion the construction of the equipment and its various uses have been covered. The importance of the development of the long length silicon carbide tubes has also been stressed. The following discussion covers the basic operation of the equipment and typical results possible. Hydrocarbons, ranging from natural gas through to heavy oil are cracked in a continuous process with predetermined

(Continued on page 44)

NLRB Says Who's Who in Voting

by James H. McGourty
Labor Relations Analyst

THE National Labor Relations Board has directed that an election be held among the employees of the Pacific Gas and Electric Co. to determine whether the employees of this company will be represented at the bargaining table by the AFL's International Brotherhood of Electrical Workers, the CIO's Utility Workers Union of America, or by neither union.

In issuing the order for this election, the NLRB determines, on the basis of its analysis of the job content of certain borderline occupations peculiar to the utility field, which jobs are and which jobs are not exempt from organization by the rank and file union.

The Taft-Hartley Act provides that: supervisors are excluded from the rank and file union; employees working as guards may not bargain collectively with the employer through the same bargaining unit as non-guard employees; and professional employees have the option of joining or remaining outside the bargaining unit of the rank and file employees.

Further, the United States Supreme Court has recently upheld the decision of the United States Circuit Court of Appeals at Cincinnati in its decision that a worker is exempt from the provisions of the Taft-Hartley Law if he performs some supervisory tasks some of the time (AMERICAN GAS JOURNAL, Oct. 1949, p. 62).

It is reported that the NLRB considers that watch engineers are not supervisory employees and must be grouped with the rank and file; that plant engineers are supervisors; that all subforemen because they do not have "the power to hire or discharge, reward, discipline or change the status of any employee or make effective recommendations for the same, to plan work," are not supervisors. Measurement inspectors are supervisors as are senior estimators, but run of the mill estimators are exempt as being professional employees by virtue of their highly specialized schooling.

Power surveyors, mappers and map posters are not to be exempt on technical grounds. Service operators, division and routine surveyors, transitmen, system dispatchers and division operators are ordered grouped with the rank and file membership. Although collectors and meter readers perform work that is "to some extent clerical," NLRB ordered them in with the physical workers.

Such grouping as was done with the employees of the Pacific Gas and Electric Co. paves the way not only for powerfully strong company and system wide union structures, but also ultimately industry wide labor organizations of terrific power.

Although the Pacific Gas and Electric Co. has a broad range of job classifications, it might be correct to regard this event more as a guide to utility managements' thinking than as a precedent for all utilities large and small. Job content for the occupations mentioned above varies somewhat from company to company and this classification was done on the basis of job content.

Laboratory Burners Need Special Attention When Gas Changeover Occurs

by H. K. Richardson

This is the second in a series of articles by Mr. Richardson on the practical aspects of gas conversion as applied to specific types of equipment. The first, a monograph on glass working units, appeared in AMERICAN GAS JOURNAL *for October.*

Future articles will treat on the problems incident to the conversion of radiant burner installations, general industrial and commercial furnaces, and domestic heating equipment.

—THE EDITOR.

WHEN changing a system from manufactured gas to natural gas or a mixed gas, one of the problems in certain communities is the large number of Bunsen, Meker and blast or nozzle mixing type of burners used to do a large variety of jobs. Included are technical and dental laboratories, jewelry manufacturers, hand brazing operators, neon sign shops, and other glass-working plants using gas-air.

Most of these jobs are not critical in the sense of either time of heating, gas consumed or high flame temperature needed. A few, however, depend on a specific flame characteristic or a definite location of the hottest part of the gas-air flame. These are the situations that cause the most complaints when the changeover is made. However, the slower flame propagation of the natural and mixed gas poses problems of flame stability which require attention in all the burners and gas mixtures.

Details of experience encountered in the conversion of these various types of burners follows:

Bunsen Burners

For many jobs the Bunsen burner is the simplest burner for the work in hand. Its very simplicity and ease of burning on manufactured gas has led to a neglect of the fundamental principles of gas combustion in its construction. In ordinary laboratory use where solutions only are to be heated, the main requirement is that the burner shall remain lighted without attention. In case of ignition of precipitates, a higher temperature must be reached. In this latter case a requirement of flame temperature and heat release (Btu/hr.) is involved. In case of conversion, this operation points up the factors that require attention: i.e., a knowledge of the burning characteristics of manufactured and natural gases and their mixtures.

Burning Characteristics of Gases

As has been said before, it cannot be too greatly emphasized that in all conversion problems it is very necessary to know for the manufactured gas in use and the new gases to be substituted the comparative values of the following.

1. *Rate of flame propagation* of the gases in the range of air-gas mixtures to be used.

This governs the stability or lifting of the flames. Figure I taken from AGA Gaseous Fuels shows the flame propagation of the usual gases at the full range of air-gas ratios encountered in practice for the burners under discussion.

2. *The flame temperature* that can be obtained in the range of gas-air mixtures encountered.

This governs the maximum intensity of the flame and the rate of heat transfer to the object being heated.

3. *The heat release* Btu per unit area of port for the different gases must be known.

This varies with each gas and governs the quantity of heat that can be applied in unit time to a job.

Bunsen Burner Operation

The ordinary straight tube Bunsen burner shown in Fig. 2 burns well on manufactured gas. It can be adjusted from a soft flame without cone and of very low temperature to a hard fairly intense flame with a plainly visible cone and of good temperature. However, when supplied with natural gas the burner is not commercially usable because:

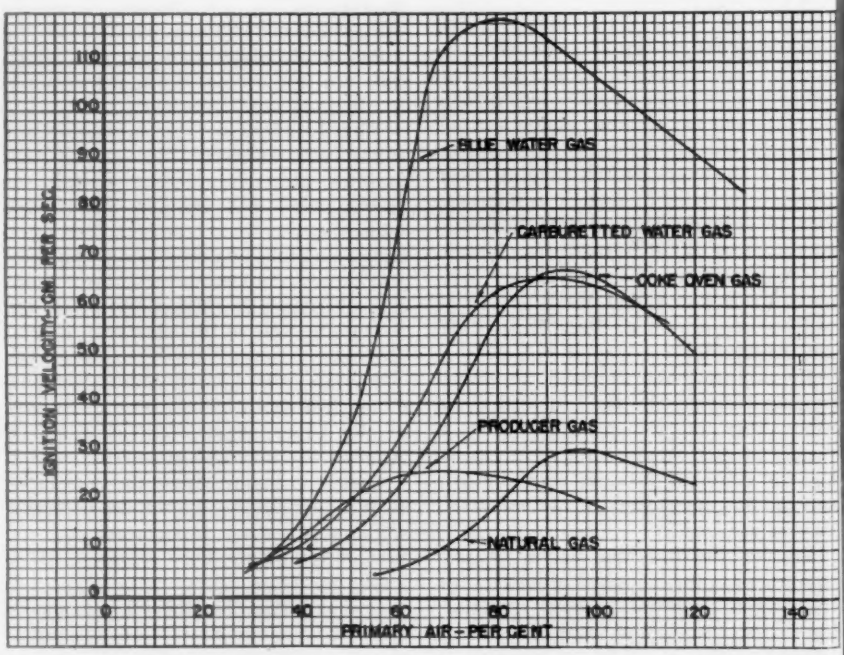


Fig. 1

1. The flame blows off when any usable adjustment is made.

2. When attempt is made to burn its rated Btu the flame is yellow and full of carbon.

3. When the air and gas rates are adjusted to give approximately the right flame shape, the burner stays precariously lighted and the Btu release per hour is less than 1/5 of its rating on manufactured gas.

To correct the above difficulties and make the burner useful on natural or mixed gases, temporary expedients can be used on mixed gases but reconstruction is necessary on natural gas to approximate the results obtained on manufactured gas. These expedients are as follows:

A. *A pilot flame* must be used to keep the natural gas flame anchored. This is accomplished by enlarging the burner tip so that the issuing gas-air mixture is slowed down and the flame burns from a low pressure area of gas.

At 70 per cent air entrainment, manufactured gas has a flame propagation of 1.6 feet per second, natural gas has a flame propagation of 0.35 feet per second. This means that to stay lighted the issuing natural gas-air mixture must be slowed down to 1/5 the rate for the manufactured gas.

This is accomplished by use of a flame retainer which is an enlarged annular opening surrounding the main burner

c—Fisher Scientific Co.

Fig. 2

port. Several types of these are in use. The simplest is only a nipple larger in diameter than the burner tube and extending slightly beyond the end of the tube. The most commonly used and the best for most work is an annular ring surrounding the end of the tube. A portion of the gas air mixture is by-passed to this annular ring through a number of small holes drilled in the tip of the burner tubes. Gas expanding into the larger area burns at a lower rate and thereby anchors the flame burning from the main port.

B. *Low Temperature and its cure*—As will be seen from Figure 4, page 18, October 1949 issue of AMERICAN GAS JOURNAL, a natural gas air flame never can be as hot as a manufactured gas air flame and it is more sensitive to change of air-gas ratio.

Indications available show that for a 70 per cent air entrainment the flame temperature of

(1) Manufactured gas will be approximately 1820° C — 3298° F
(2) Natural gas will be approximately 1730° C — 3146° F

It is therefore evident that some means must be employed to raise the air-gas ratio in natural gas burners where the flame temperature is required to be higher.

In research paper R.P.* 1991 *Journal Research*, Vol. 42, June 1949, the National Bureau of Standards has brought out the essence of this problem and showed the characteristics of construction needed to solve the problem. A short abstract of this paper covering its scope is given at end of this article. Here only a few data are used. Figure 3 shows two natural gas burners one before and the other after the reconstruction.

The following facts show the advantage of the reconstruction.

When received, the burner at the left in Fig. 3 burned on natural gas with a soft flame at 59 per cent air entrainment and had a heat release of 2,260 Btu per hour. This was not a satisfactory flame so the air entrainment was increased to 70 per cent but the Btu release per hour was reduced to 1,586 making it unsatisfactory for most laboratory use.

The burner when reconstructed as shown burning in Fig. 4 at the right has a well defined cone and good usable flame. The Btu release has been increased to 5,160 Btu per hour, thereby making it a generally useful laboratory tool.

Thus in a conversion job—1. In case of mixed gases, an addition of a pilot or a low velocity annular ring spreading the issuing mixture will meet most requirements and stabilize the flame so it can be used but at a lower Btu release, but

2. When over 50 per cent to 100 per cent natural gas is used, the burner must be redesigned to have the proper range of adjustment and have the full Btu rating of 5000 Btu/hr. desirable for general laboratory work. R.P. 1991 indicates that the port area and the air shutter area must be enlarged and the gas spud orifice must be adjusted to the gas used. Details of these changes are the same as shown in Figure 4 for the Meker burners.

* *See Reference Bibliography at end of this article.*

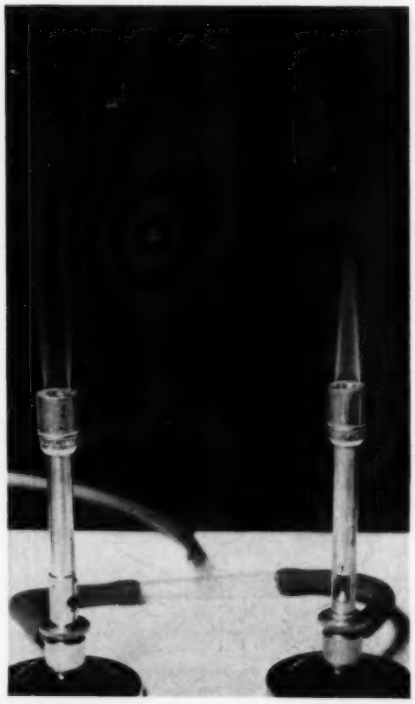


Fig. 3
Flame shapes burning natural gas, both burners at rate of 5000 Btu/hr.
Burner at left: Flame soft, not usable for intense heating.
Burner at right: Flame cone defined and temperature higher—shows a better air-gas ratio.

Meker Burner

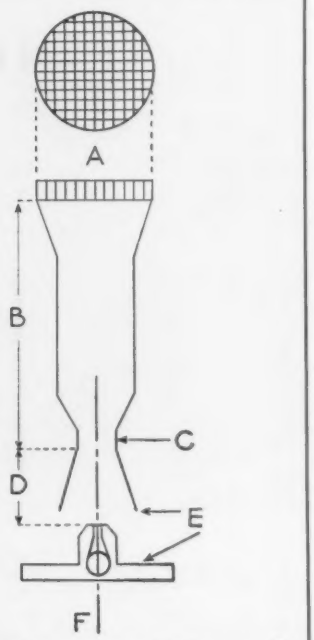
A Meker burner for laboratory use is shown in ideal section in Figure 4. These burners are a preferred burner for laboratory use as they allow the burner to be placed closer to the work than the Bunsen and are usually of greater capacity.

Conversion to natural gas affects these burners in a similar way to the Bunsen with the added requirement that the proportions of the mixing tube must be more carefully considered.

The following characteristics must be noted.

1. **Btu release is proportional to the port area. At 70 per cent air entrainment this is
   (a) For manufactured gas—19,000 Btu/hr/1N²
   (b) For natural gas—10,000 Btu/hr/1N²
2. Throat area is 40 per cent the port area.
3. Primary air shutter opening is 2.25 X the port area.
4. Length of the burner mixing tube is six times the throat diameter.
5. Center line of spud and throat must be accurately aligned.
6. Spud diameter must, for very ac-

** *Reference No. 2.*



A—Port area, proportional to Btu per in^2.
B—Burner mixing tube—six times throat diameter.
C—Throat area—0.40 times port area.
D—Spud to throat distance—two times throat diameter.
E—Primary air shutter area—2.25 times port area.
F—Center line, spud throat.

Fig. 4

curate work, be accurately proportioned to

(a) The pressure of the gas supply and
(b) The actual Btu capacity as determined by
  (1) Port area
  (2) Btu of gas
  (3) Sp. Gr. of gas

These requirements for a proper atmospheric burner have been known for some time, and adherence to these dimensions is essential to proper use of natural gas. In conversion to natural or mixed gases the straight side tube tipped Meker burner is of no practical use. In case of the mixed gases the simple flared tip is of help if the Btu capacity is not a factor. In case of full 100 per cent natural gas or where the full Btu rating of the Meker (usually 10,000 Btu/hr.) is needed it is necessary to use a fully redesigned burner (see Fig. 4) to get the proper efficiency from the gas.

Nozzle Mixing or Blast Burners

The nozzle mixing or blast burner either custom or home made is a part of all laboratory equipment and is used for a great variety of purposes because

(1) It has an infinite range of adjustment for
  (a) quantity of gas and air
  (b) Any kind of flame from soft to very hard desired
(2) It is simple to control, responsive to the skill, whim and prejudice of the operator
(3) Does not flash back no matter what gas is used

Figure 5 illustrates one of an infinite variety of such Burners, all of which use compressed air for the air supply.

While this burner operates well on manufactured gas, its performance is very poor on natural gas and indifferent on mixed gases. The trouble is lack of proper mixing of the air and gas when the gas has a slow rate of flame propagation. To be of practical use these burners must be modified by placing a perforated section around the center tube to provide a slow flame for piloting purposes, but none of these changes make the burner as useful on natural gas as it is on manufactured gas.

A small type, known as the MIT burner, has been experimentally modified by placing a natural gas three row piloted tip (similar to AGF 622N) in front of the air jet and crudely premixing the gas and air before it enters the tip. In laboratories where hydrogen and oxygen are available, it is customary when using natural gas to bleed hydrogen into the gas line or oxygen into the air line to get the working conditions satisfactory to the glass blower. In this case the unmodified burner can be used. It is also necessary, when work requiring the highest flame temperature of manufactured gas is needed, to add the oxygen to the air for natural gas use.

These difficulties all point to the use of a burner with a proper mixing arrangement as the best solution of the problem, but most laboratories will probably take the easier way of using oxygen to pep up the air. In all these changes it must be remembered that a given area port will only release at the most 60 per cent the Btu in natural gas that it releases in manufactured gas. Many times a burner which has heated an object satisfactorily on manufactured gas must be increased in size for natural gas.

Hand Torches—Gas-Air—Welding

Hand torches made up of glass working type of burners are covered by the information given in a previous article in the October 1949 AMERICAN GAS JOURNAL.

Hand torches of the nozzle mixing variety are covered by the technical information given above on blast burners. Here however the trend is towards the use of mixing arrangements to insure the proper flame characteristics. Figure 6 shows an arrangement of a blow-pipe or blow torch where the gas and air is mixed before going to the tip. In such cases means are available for mixing the gas and air in the desired proportions.

Ribbon Burners

For many jobs where continuous wire annealing or bending of long glass tubes for neon signs is called for—ribbon burners with atmospheric injectors or the two pipe systems are needed. These usually give low intensity flames but those designed for manufactured gas do not burn satisfactorily on natural gas. It is necessary to change the size of the mesh. A burner that burns OK on manufactured gas will usually burn satisfactorily on the mixed gases when the air gas ratio and burner head pressure are adjusted but must be replaced with the proper size mesh burner for natural gas use. With care in setting the natural gas burner can be used on manufactured gas; on mixed gases it is satisfactory.

Summary

Work done in converting Bunsen and nozzle mixing burners from city to natural gas has only emphasized what was found out in the use of burners for high speed glass working, namely—

(1) The rate of flame propagation of the natural gas and
(2) its lower flame temperature result in
(3) a lower heat release per unit port air and call for burner construction changes.

These changes in construction required to get best heat release and operating temperatures from the natural gas are:

Meker Burners

(1) The provision of a pilot area (flared heads) to hold the flame.

(2) Provision of a throat area to increase burner head pressure and air-gas ratio.

(3) Provision of larger openings in the air shutter to allow a larger proportion of air to gas in the flame.

c—Fisher Scientific Co.

Fig. 5

(4) Tailoring the gas orifice (spud) to the Btu release (Port area) and the gas line pressure.

(5) Lining up the spud to the centre of the throat.

Bunsen Burners

Items—(1), (3), (4) above must be taken into account with this type of burner.

Nozzle Mixing—Blast Lamps—Torches

The efficiency of the simple nozzle mixing burner is so poor on natural gas and it is so hard to adjust that the use of a distributor head in the gas nozzle only helps a little. The best results are either of two means—replace end by a proper piloted nozzle or better still—change to a unit of the proper mixer type or so called carburetter type.

Ribbon Burners

The mesh size must be changed to operate on natural gas.

Bibliography

(1) A study of Laboratory Bunsen Burners for Natural Gas, John H. Eiseman. Jour. Research Nat. Bur. of Standards, R.P. 1991 June 1948, Vol. 42 page 541-556.

Sixteen different burners—eight Bunsen, eight Meker sold as satisfactory for natural gas were purchased and their limits of operation determined. All showed a need for changes of construction if really satisfactory operation was to be obtained on natural gas. Comparing these burners with the requirements of known atmospheric burner designs showed four defects.

(a) Too small a port area for the Btu release required.

(b) Insufficient primary air openings limiting the air entrainment to below the desired value.

(c) Improper throat size.

(d) Improper gas spud size.

Two burners, one Bunsen and one Meker, were modified according to the known fundamentals and both showed great improvement and about double their original capacity thereby indicating that when these known fundamentals of gas burning are applied with technical skill, much better burners are obtained.

Note by the Author

The results are so startling that it seems that the burner manufacturers should have a house cleaning, scrapping all the old fossels and bringing out a new line which will be universal (i.e.) usable on manufactured, mixed and natural gases.

This paper can be profitably read by any one that has to handle the conversion of laboratory burners to natural gas.

(2) Research in Fundamentals of Atmospheric Gas Burner design, Bulletin No. 10 American Gas Association Testing Laboratory.

(3) Scientific Glass Blowing and Laboratory Techniques. W. E. Barr and V. J. Anhorn—INSTRUMENTS Vol. 18 December 1945—Pages 875-878.

This section of the article describes in detail how the various kinds of burners are used in laboratory glass working.

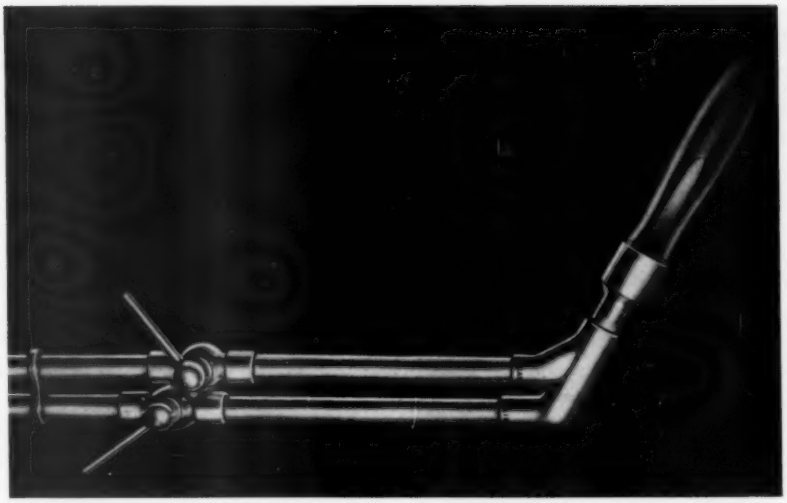


Fig. 6—above.
Below are shown burner heads. The one at the left is for natural gas, and the one at the right for manufactured gas.

Recent Labor Activities Cover Wide Range Of Interest to Management

THE National Labor Relations Board reports that more local unions were in compliance with the non-Communist affidavit filing requirements of the Taft-Hartley Act on December 1, 1949 than at any time since August 22, 1947, the date the Labor Management Relations Act became effective. On December 1, 11,345 local unions were in full compliance.

A total of 108,807 union officials representing 192 national unions and 11,345 locals were in full compliance with the non-Communist provisions of the Act. Although the increase in the number of union officials filing is due primarily to the continuing increase in the number of affidavits filed by the officers of the CIO Steelworkers, it is heartening to note that the increase continues despite the cleavage between the right and left within the CIO. The divorce of left wing unions by the right wing elements of the CIO appears to have done nothing to strengthen the forces of the Communist sympathizers.

The affidavits and financial reports must be filed annually for a union to be eligible to use the facilities of the National Labor Relations Board either to file an unfair labor practice charge or to obtain the Board's services in conducting elections.

The NLRB ruled that the secondary boycott ban of the Taft-Hartley Act does not prohibit a union of truck drivers from picketing trucks of their employer at the premises of a customer who also is an employer.

The Board emphasized that its ruling does not apply to picketing which extends around the customers premises and which is directed at the customer rather than at the trucker who is the employer of the pickets.

NLRB ruled that picketing at a plant's entrance was not coercion when employees were not threatened when passing through the gates and no violence took place. NLRB held that a severability clause in a contract containing an unauthorized union security clause is no bar to an NLRB election to determine the bargaining agent.

NLRB found that time spent in griev-

(Continued on page 46)

Winter Heating Load Factor Creates Supply Problems for Transporters

by S. B. Irelan

President, Cities Service Gas Co., Oklahoma City

S. B. Irelan

THE supply problems of natural gas transporters stem from a great many sources, and are generally common to all companies.

The demand of the public for natural gas as a fuel creates these supply problems.

Consumers want unlimited and unrestricted natural gas service and nothing short of this type of service will satisfy them permanently. The public and the state regulatory bodies look to the transporters of natural gas to supply this kind of service. The consumers, generally, do not understand the necessity for the restriction or limitation of the use of natural gas for any of their fuel purposes and they are not cognizant of the reason why unlimited and unrestricted use is not always available and possible under all circumstances. The extremely low comparative cost of gas as a fuel augments and emphasizes the significance of this situation.

The public have but little understanding of the effect of the seasonal demand for space heating on the cost of service, and the difficulties of supply. When it gets cold, they want the heat that natural gas as a fuel gives, and in plentiful quantities. The public and the state regulatory bodies do not think that the suppliers have any right to attempt to control and dictate the type of natural gas service that they are to enjoy.

Bringing natural gas to new markets on a limited basis at first will result, no doubt, in eventually creating a demand for unlimited, unrestricted domestic use for cooking and space heating purposes. Facing the situation of greatly increased withdrawals, the known reserves will be called upon not only to supply the full unrestricted requirements of present markets, but greatly enlarged markets from the further extension of pipe line facilities. The main problem of the transporter will be to supply these requirements of unlimited and unrestricted service and to meet the demands arising from this type of service.

As a result the transporter faces, as never before, a supply and transportation problem that is greatly enlarged and made much more difficult. Nothing to compare with it has ever before been experienced in this industry.

Equating supply and transmission capacity to increased demands is a matter of continuous consideration in this business. In no other industry is there the need to balance so carefully market supply and demand as there is in the natural gas business. It takes planning and provision for additional capacity well in advance of actual need to maintain continuous and adequate service.

In the past we have not been too much worried over the fact that when a cubic foot of natural gas was consumed, it had to be replaced with another cubic foot in order to assure continuing service over the years. Even now, new natural gas reserves are being discovered at a rate in excess of materially increased annual withdrawals.

However, a survey of the situation as to future supply would seem to point to the problem becoming more difficult on account of more competition and increased withdrawals in shorter periods from the presently proven fields. The depletion of these proven fields will require the extension of pipe lines over long distances and to different geographical locations to new fields in order to maintain the supply.

The price of natural gas as a fuel, compared to its competitors, has caused such a widespread growth in the demand for this refined fuel for space heating, both domestic and commercial, that we in the natural gas business are now engaged in a mad scramble to provide more reserves and more pipe line capacity to satisfy this growth. This price situation has been the primary cause for the building and projection of many pipe lines to new territories from the present proven areas.

Growth in demand has materially changed some of the supply and transportation problems, particularly of those companies experiencing a marked increase in the percentage of space heating saturation.

Natural gas has for many years been known to be the ideal fuel due to its cost, cleanliness, efficiency and ease of use. Its acceptance under previously competitive rates, particularly for domestic uses, gradually increased over a long period due to improved dependability of service, increased availability, refinements in utilization equipment, and protection afforded by safety devices.

Prices Have Been Lowered

Under the Natural Gas Act, the ultimate sales price of natural gas to consumers, particularly domestic consumers, has currently been reduced or kept far below its real and comparative worth. In almost all sections of the country price comparisons show that natural gas as a fuel is considerably cheaper for most types of service. As a result, the natural gas industry is today faced with an unprecedented increase in demand. Thus far it has not been possible for the industry to keep pace with this extreme rate of increase due to the shortage of steel and other necessary materials, plus the time consumed for physical construction of new facilities.

What are the characteristics of this new demand and what can be done to serve it adequately and properly? By far the greatest part of the new demand is for space heating. Space heating is a

A paper presented at the annual meeting of the Independent Natural Gas Association of America, Dallas, Oct. 31, 1949.

winter-time load. Its requirements for peak days and peak hours are a multiple of several times its average daily winter use, and many times its average daily annual use. Increasing the amount of this type of business lowers the system load factor. Obviously, its effect becomes increasingly more serious as the saturation of space heating customers approaches 100 per cent.

The Southern sections of the country are not confronted with serious load factor problems. The Northern sections of the country generally have extended winter seasons, which create more favorable space heating load factors. The Central section, where winter extends only for four or five months, and where temperature fluctuations are extreme, faces the most difficult situation in maintaining a reasonably high system load factor.

Demand Will Increase

Recently published figures indicate generally that current domestic space heating saturation served by natural gas is well above 50 per cent (in most cases approaching 100 per cent) in the Southern states, and far below 50 per cent in the Northern states.

The greatest unsatisfied demand for natural gas for space heating is in the Central, Northern and Northeastern states. The saturation there is expected to climb at a rapid rate so long as additional reserve supplies and transmission capacity can be made available. Existing pipe lines and those under construction are currently proposing such increases in capacity. How many more new lines or how much more capacity will be provided to serve the new demand depend largely upon the availability and life of the natural gas reserves now discovered and to be discovered.

It is an obligation of the natural gas industry, first, to assure adequate service for its existing markets, and then to provide further market expansion only to the extent that this new service can be assured over a long period of years. Regulatory commissions must recognize and share this obligation. Beyond this, consideration must be given to the load factor of the pipe lines and its bearing on the natural gas sales rates as compared to effective sales rates of alternate fuels. The degree to which load factor can reduce without imperiling the economic safety of a pipe line will depend mainly on the rate at which sufficient gas can be sold in competition with alternate fuels.

It is estimated that the load factor for space heating will vary from 15 to 30 per cent over the country. Because every pipe line must be operated at a reasonably high load factor, those serving a large volume of space heating gas are confronted with the problem of offsetting peak day requirements in some manner.

The gas industry has extensively utilized many devices to meet this peak day demand. The curtailment of interruptible industrial load is common and effective.

Underground storage is utilized in those market sections where depleted gas reservoirs are available and furnish substantial percentages of peak day requirements. Both high and low pressure tank or pipe storage are also used.

Underground storage, in my opinion, is much to be preferred over interruptible industrial sales. Interruptible industrial gas of necessity must be sold at relatively low rates and represents a substantial drain on the natural gas reserves. While such sales are essential in the economics of natural gas transportation, they should be minimized in favor of storage to the maximum extent possible.

Presently utilized peak shaving devices include the use of manufactured gas, propane-air mixtures and catalytic processes. A new and important peak shaving device has been developed and has been in use for the last year or two. The device is a burner which is capable of burning gas alone, or burning oil with a small amount of natural gas. In operation, the burner uses natural gas during periods when heating requirements are normal. It converts from gas to oil automatically when the temperature drops to a pre-determined degree. Experience so far has shown that such equipment, properly utilized, can be made very effective toward the solution of gas space heating peak day problems.

Limitations or Increased Rates

If one or more peak shaving devices do not provide adequate service to all space heating and other non-interruptible consumers on peak days, and if it is uneconomical to construct additional transmission capacity, then there are only two alternatives left—one, limit the connection of new gas space heating; or, two, increase the rates for space heating to comparable costs with other fuels in order to shift a part of the increasing demand to such other fuels.

A large number of gas transporters selling to distributors, or other pipe lines, limit by contract or price penalty the maximum quantity of gas which may be purchased in a given space of time. While such an arrangement is of some protection to the transporter, the basic problem of characteristics of the demand and adequacy of service are not thereby determined or solved.

During the war the War Production Board imposed a limitation in given sections of the country on the connection of new gas loads. Subsequently other governmental authorities have imposed restrictions on the connection of certain types of customers or gas loads. Some of these restrictions have since been lifted, but many are still in effect and, undoubtedly, will continue in effect until such time as adequate facilities are available. Practically all of the lines extending from the Middle and Southwest to the Northern and Northeastern markets are operating under allocation orders, and even new facilities providing tremendous additional capacity are under allocation orders.

A natural gas drilling crew at work in Texas. The looped hose carries mud to the drilling pipe.

If no limitation on the connection of new space heating customers or load is imposed, and if allocation of available capacity is not made, transporters are faced with the attachment of an increasing amount of low load factor business and rate adjustments will become necessary as the transmission capacity is increased to meet resulting peaks. Space heating customers would ultimately be forced to bear the resultant increased cost of insufficiently utilized transmission facilities. The end result may be that gas rates for this type of service might rise to the point where the demand for space heating would be limited by the economies of substitute fuels.

It is generally conceded that all of this sudden growth in demand has been chiefly due, as before mentioned, to the "give-away" price resulting principally from the adoption of the original cost rate base formulas now in effect.

It is appropriate at this point to review what some of the effects to date

have been, due to the application of the original cost rate base formulas as applied and adopted by the regulatory bodies, specifically on exploration, production and gathering of natural gas. Developments to date seem to indicate that the strict application of the formula of original cost, depreciated on a straight line basis, to production and gathering, together with the adoption of a low utility rate of return, will have the effect of putting the transporter out of the production and gathering business. Many transporters are even now looking to others for enlarged present and future supplies.

The business of producing and gathering natural gas is a high risk business and should not be classed on the same basis with that of a public utility. The main factors to contend with in the utility operations are replacements due to depreciation, inadequacy and obsolescence over long periods of time, as compared to rapid depletion and complete replacement of natural gas reserves, requiring exploration and discovery first which is in itself a very hazardous undertaking.

The future supply problem of the transporter is becoming particularly difficult due to the competition for the remaining reserves now undedicated and unsold in the presently proven fields, and the possibility of having to make long extensions to new fields. This problem is intensified by the deliverability difficulties brought about by proration. It is one of the important problems affecting the present and future welfare of the natural gas transporter.

Investment and Income

Exploration and discovery, to create future supplies sufficient to take care of ever-growing demands, present a major problem. Change in the geographic location of new gas fields, requiring longer extension of field and main lines, and a continuing close study of the exploration by others, will be necessary to provide adequate supplies for future growing loads. Field price-fixing orders, which have already been made in Kansas and Oklahoma, have materially affected the cost of gas in the field. The decreasing ratio of transportation company produced gas, together with the renegotiation of purchase contracts, will cause further increased costs which will have to be recognized by regulatory commissions and necessary rate adjustments effected if the industry is to remain on a sound financial basis.

A recent Federal Power Commission release shows that the investment in the physical plant of 83 natural gas companies has increased 17.4 per cent over a 12 month period, while the net income of these same companies has increased only 9.3 per cent. A continuation of additional investment in facilities will require that income keep pace with investment.

In many companies industrial markets have reached a degree of saturation which will prevent any substantial filling of additional valleys created by increased capacity. This means that many millions of dollars will be required to maintain pipe line capacity that cannot be utilized except for short periods during the cold weather.

Due to the very low comparative cost of natural gas as a fuel, we think that the consumer will continue to use this refined fuel because of its many advantages, even at substantially increased rates. It is thought that there will be no diminution in the demand for natural gas for space heating purposes even at considerably higher rates until practically 100 per cent saturation is reached, provided the gas is made available.

One of the many important problems of the transporter is the mechanical and physical one of maintaining continuous service under all conditions. We have to be on the alert to abnormal and infrequent situations arising from line breaks, explosions, floods and fires which involve impairment of service for varying durations. The operating organizations of natural gas pipe line systems deserve high praise for their record of continuity of service under all kinds of load, weather and temperature conditions, and overcoming the difficulties of turning on and off gas wells in fields hundreds of miles from the market centers.

The winter supply problems of the transporter of natural gas will require a great deal of intelligent planning for the future.

With such planning, I believe this challenge of satisfactorily supplying the natural gas market requirements will be met by all engaged in this business in the same fashion that private enterprise has solved its problems before.

Old-Age Security Demands Sound Foundation

ALL of the attempts to provide social security, whether through agencies of government or of private industry, will be helpful only if the old-age pension plans are equitable, financially sound and efficiently administered, Benjamin F. Fairless, President of United States Steel Corporation, said in an address before the Illinois Manufacturers Association on December 13.

If such plans "rest upon an uncertain economic foundation, they will not long be capable of providing any kind of security," he said. "Moreover, if they overtax the strength of the foundation, they will fall. In view of the assignment of new responsibilities to industry in the field of social welfare, it is increasingly important that the strength and prosperity of industry be safeguarded, to the end that it may meet its total obligations to employees, customers, and stockholders, without distress or failure.

"Along with making provision for pensions and other benefits for the future, there will be the special task of providing, in accordance with the new basis, and insofar as possible, financial assurance for the past or accumulated service credits of employees whose employment began years before the current scheme became operative.

"These matters require money, altogether substantial sums of money, wherefore it is more than ever essential that the earning power of industry be fostered in adequate degree for the services it must render," Mr. Fairless said. "Everyone must realize that the load on industry is heavy, and that it must not be allowed to increase to the breaking point. Present factors not helpful in the situation are burdensome taxation, interference with production, unwarranted probing, baiting, harassment and misrepresentation, along with recurrent attempts at fanning up an atmosphere of hostility to business.

"The condition should be reversed. Experience in modern world affairs has shown that a strong, virile industry is indispensable to national survival, and national survival is item number one in the book of security. Additions to item number one are desirable if planned with wisdom and care, and if they contribute in an equitable manner to the common good.

"As we address ourselves to the solution of problems posed by the recent agreements in industry, we look, with solicitude, to our Government to undertake only such measures pertaining to the social welfare as can be provided without distress or failure on the part of individuals and groups of individuals who furnish its sustenance. Our appetite for the establishment of a socialized state in America is certainly not whetted by an examination of anything that can be seen in Europe, either west or east, from Great Britain to Russia. Above all, we hope that the independence and self-respect of beneficiaries of social security in this country may be preserved in the knowledge that they, by their own contributions, have discharged a basic obligation to themselves and to society, without the surrender of freedom."

New Long Radius Ells in California Line Will Aid in Cleaning Operations

by Arthur Rohman
Western Editor

A LONG-RADIUS ell developed by the Southern Counties Gas Co. of California, Los Angeles, is a new pipe line construction feature designed to facilitate pipe line cleaning operations.

The new ell is being used in building the Southern Counties portion of loop lines which will boost the capacity of the more than 100-mile pipe line between the La Goleta underground storage field north of Santa Barbara and the Los Angeles metropolitan area. Completion of the looping projects being constructed by the Southern Counties and the Southern California Gas companies is scheduled for early January and will boost deliveries through this line by 40 million cu. ft. daily.

The effectiveness of the sweeping turns in the Southern Counties portion of the project will be tested soon, as the line is scheduled for cleaning before being put into operation. This procedure, which was followed prior to putting the recently completed San Diego line into service, consists of cleaning the pipe in sections of from two to 10 miles using "pigs" or "go-devils" manufactured by the T. D. Williamson Co., of Tulsa.

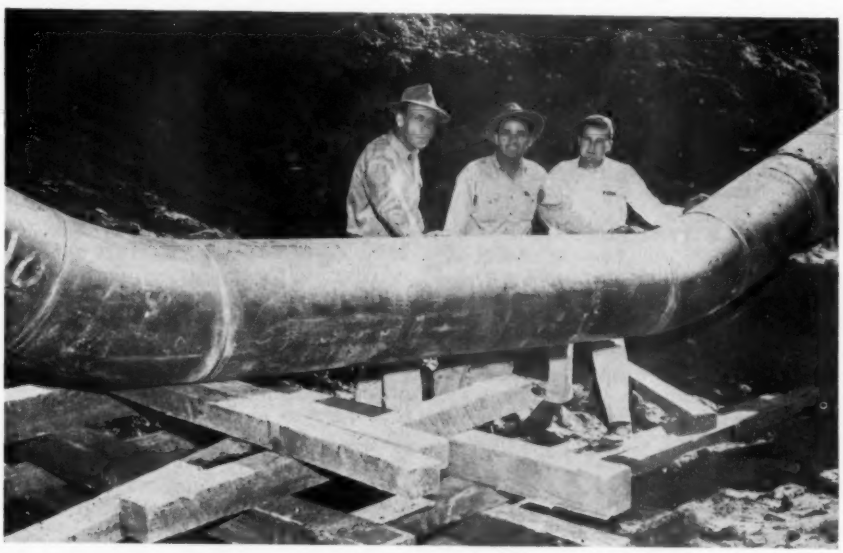
This is a picture of a long radius 90 deg. ell in the Goleta pipe line.

Ordinarily in order to obtain full cleaning effectiveness of the wire bristles on the "go-devil," it has been the practice to push the "pig" through the line at pressures ranging from two to five pounds. At times the "pig" has a tendency to slow up or become caught in the line, and this is especially true at sharp right angle turns.

When this occurs, it is necessary to boost the pressure, sometimes up to 10 pounds. Obviously, the control of the velocity of the "pig" is then more difficult, since the higher pressure propels the "pig" forward with great rapidity once the bend is cleared, reducing the effectiveness of the cleaning device.

Location of the "pig" in the line is constantly possible through the use of a 500 miligram capsule of radium placed in a removable cap on the "pig." A Geiger counter and an operator from the X-ray Engineering Co. stand by at all times to locate the "pig" in the event it should become stuck.

The long-radius ell was an idea conceived by Charles F. Briscoe, manager



This picture of two 45 deg. bends illustrates the manner in which the new long radius ells can be cut into segments and welded into the line.

This is the type of "pig" or "go-devil" used by Southern Counties Gas Co. to clean the Goleta pipe line.

of engineering services for Southern Counties, to solve this particular problem. The Ladish Corp., a drop forge concern located in Cudahy, Wisc., was requested to develop the ell.

The radius of the new ell as developed by Ladish is computed at three times the diameter of the pipe line under construction. In the case of the 20-inch La Goleta line, the radius, which is measured from the center of the pipe to an imaginary point from which the course of the ell could be extended into a complete circle, would total 60 inches. The longest radius previously used was one and one-half diameters, or in the case of 20-inch pipe, 30 inches. Thus, the sweeping turn of the pipe line permits the passage of the cleaning "go-devil" with a relatively constant gas pressure and speed.

Corten type steel, a recent development of the U.S. Steel Corp., was used by Ladish in the fabrication of the new type ell, the greater physical strength of this steel making possible the use of thinner-walled tubing than the seamless grade "B" formerly used.

The new product is rolled from sheet steel of absolutely uniform thickness into true-circle tubes that will fit into a pipe line wherever required. As a secondary advantage, then, the new ells can be cut into segments of any length that can be welded into the pipe line at any point.

The work to be completed in January consists of two 17-mile loops of 20-inch pipe to be tied into the original La Goleta pipe line built in 1944. The increased capacity of 40 million cu. ft. per day places the two Los Angeles operating companies in a more favorable position with respect to constantly increasing peak load requirements. Long range plans call for the construction of additional 20-inch loops, so that eventually the lines now being completed will become part of a separate line extending from La Goleta to Los Angeles.

Industry Stages Successful Personnel Conference

Nearly 100 personnel and employe relations executives of the gas industry attended the industry's fourth national personnel conference held at the Netherland Plaza Hotel, Cincinnati, Nov. 28 and 29, 1949. Gas utility representatives from all parts of the country took part in the conference which was sponsored jointly by the American Gas Association Personnel Committee, the Great Lakes Personnel Conference and the Midwest Personnel Conference of AGA, and the Employe Relations Section of Southern Gas Association.

The conference was opened by L. A. Brandt, The Peoples Gas Light & Coke Co., Chicago, chairman of the AGA Personnel Committee. H. Carl Wolf, managing director, AGA, pointed out the importance of personnel problems to the Association and to the industry. He declared the gas industry had an investment of about $40,000 per employe, which made each employe a veritable small business man with a responsibility for producing a return on his heavy investment. Such employes cannot be cogs in an assembly line. They must be carefully selected, adequately trained, and responsibly supervised.

Dr. Robert K. Burns, executive officer, Industrial Relations Center, University of Chicago, commented on the analysis of supervisory and organizational needs and the development of appropriate supervisory conference material in order to improve the effectiveness of a program.

F. R. Rauch, vice-president, The Cincinnati Gas & Electric Co., presided at the luncheon meeting, with Walter C. Beckjord, President, Cincinnati Gas & Electric, as guest speaker. From the background of experience of a company noted for good public and industrial relations, Mr. Beckjord stressed the importance of a good industrial relations program to a gas utility company.

H. H. Duff, Panhandle Eastern Pipeline Co., chairman of the Midwest Personnel Conference, presided at the afternoon session. The key speakers were Eskil I. Bjork, vice-president, The Peoples Gas Light & Coke Co., and Dr. Daniel Katz, University of Michigan. Mr. Bjork, who joined the Chicago utility company shortly after World War I, has a specialized knowledge of finance and personnel functions. He has done considerable research work on pension matters and is regarded as an authority in the field of industry pensions. Dr. Katz reported on developments in methods of studying human relations.

E. L. Ramsey, The Laclede Gas Light Co., St. Louis, chairman of The Great Lakes Personnel Conference, was chairman at the meeting on Tuesday morning. Dr. Jay L. Otis, director, Personnel Research Institute, Western Reserve University, spoke on testing and job evaluation. He advised how management could use a sound wage administration to promote good employe-employer relations.

Employe benefits have been under study by the Personnel Committee of AGA for two years and V. H. Luneborg, Arkansas Natural Gas Corp., chairman, Employe Relations Section, SGA, reported some of the more important conclusions drawn from this year's survey of fringe benefit costs. This report was followed by a symposium on absenteeism directed by a panel with G. M. Peterson, Public Service Electric & Gas Co., Newark, N. J., as chairman.

The importance of absenteeism was pointed out by D. S. Sargent, personnel director, Consolidated Edison Co. of New York, who reported that sick absence in 1948 cost the Consolidated Edison system approximately $2,100,000 for 172,000 days paid for but not worked. This money amounted to 2.1 per cent of the total payroll and did not include indirect costs such as overtime paid to men whose relief did not report and similar items. Other members of the panel on absenteeism were L. M. Ayers, The Peoples Natural Gas Co., and A. W. Isenhart, Dayton Power and Light Co. These experienced personnel men presented information on absenteeism experience and methods used to control it.

Year End Review Reveals New Highs Reached by American Gas Industry

by Hugh H. Cuthrell

President, American Gas Association; Vice-president, The Brooklyn Union Gas Co.

H. H. Cuthrell

THE growth of the country's natural gas system, the installation of new gas making processes and other research developments, plus noteworthy expansions of production and distribution facilities by manufactured and mixed gas companies helped the gas industry reach new heights in 1949.

Tremendous extensions of natural gas transmission lines are scheduled to bring natural gas into new areas in 1950. The manufactured gas companies have construction programs planned that will further increase production and distribution capacities. There is every reason to predict that 1950 will see the gas industry record one of the greatest advances in its history.

Many new records were established by the gas industry in 1949. More than half a million new customers were added to the gas utility lines. Sales of gas to ultimate consumers reached a new high level. Revenues from the sale of gas were the highest on record. Capital expenditures for construction and plant expansion totaled nearly one billion dollars, breaking all previous records. Promotion, advertising and research activities carried on by the American Gas Association under the PAR Plan gained in volume and effectiveness during the year. Coordinated promotional and advertising campaigns carried on by the AGA, the Gas Appliance Manufacturers Association, gas utility companies, gas appliance manufacturers and dealers lifted the sales of gas appliances and equipment far above prewar levels.

Natural gas transmission lines now are under construction that will bring natural gas to metropolitan New York and New Jersey in 1950. It is almost certain that the New England states and the South Atlantic territory soon can augment their manufactured gas supply with natural gas. Promotional and advertising campaigns now planned for 1950 hold promise of sales of gas appliances this year passing even the peak records in 1948.

At the end of 1949 the gas utilities were serving an estimated 23,763,400 customers, including about 334,000 LP gas customers served directly by utilities. This was an increase of 2.5 per cent over the 23,183,000 actual customers served in 1948. Of the total number served, 13,319,000 were receiving natural gas, a gain of eight per cent; 8,566,600 were receiving manufactured gas, a decline of 0.4 per cent; and 1,544,300 were served with mixed gas, a decrease of 20.1 per cent. The decline in manufactured and mixed gas customers can be attributed to change-overs by important gas utilities from manufactured and mixed to natural gas distribution.

In addition to the customers reported above it is estimated that more than 5,500,000 customers are being served with LP gas in territories not reached by gas utility mains.

The gas industry, in the past few years, has accomplished miracles in the fields of production, promotion and service. It has a keen perception of problems that are ahead. Long range planning has been initiated that will help solve these problems as they are met. The industry is rapidly solving its supply problem. Its rates in many instances have been adjusted to cover present day costs of labor and material. It is now in a position to seek business aggressively on a firm footing. The gas industry finished a good year in 1949. It should push forward to even greater achievements in 1950.

Utility sales of natural gas during 1949 were about 3,153,335,000 Mcf, an increase of 8.9 per cent over 2,894,650,000 Mcf sold in 1948. Manufactured gas sales amounted to 420,087,000 Mcf, a decline of five per cent, while mixed gas sales decreased 8.5 per cent to total 135,577,000 Mcf.

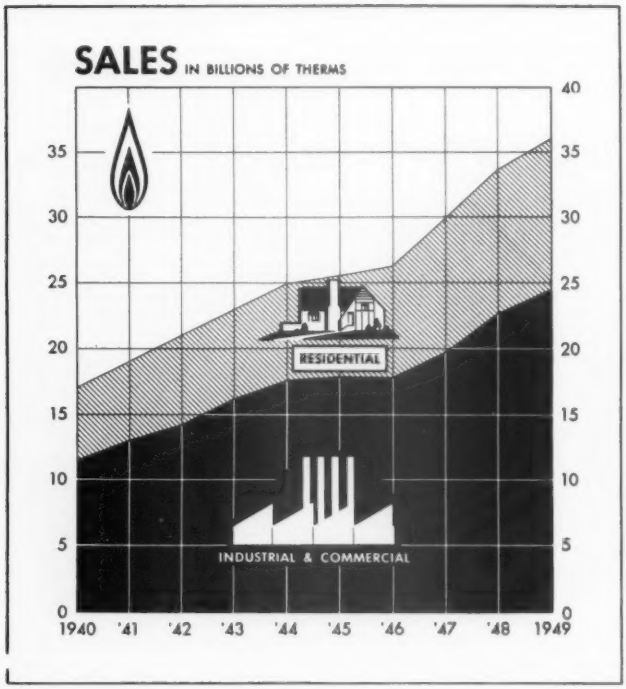
Total revenues from the sale of gas reached an all-time high of $1,694,331,000, an increase of 7.3 per cent over revenues of $1,579,603,000 in 1948. The major increase occurred in the natural gas branch where revenues rose to $1,097,328,000, 10.3 per cent over 1948. Manufactured gas revenues were $484,305,000, a rise of 4.6 per cent, while mixed gas revenues, most affected by change-overs, declined 10.6 per cent to total $91,958,000.

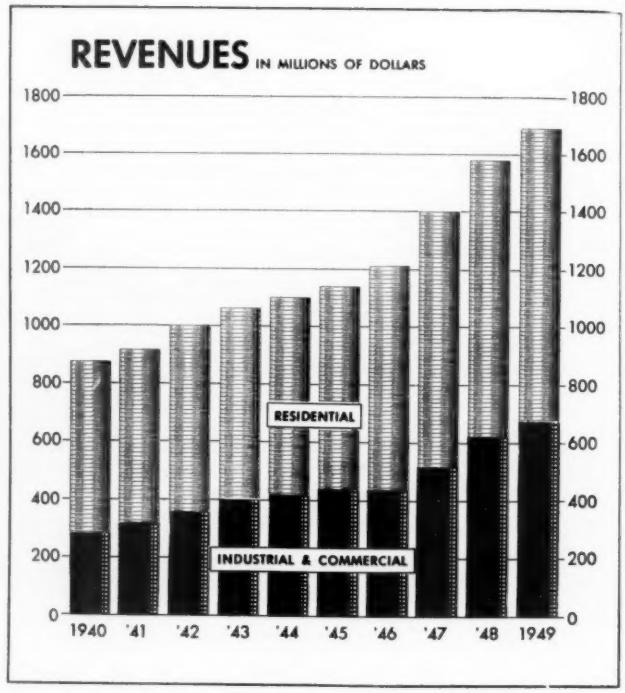
The gas industry continued its efforts to meet the ever-increasing demand for gas last year. Expenditures for gross construction of new facilities and expansion of present facilities in 1949 reached an all-time high of $943,000,000, exceeding last year's peak of $770,000,000. The industry recently resurveyed its capital requirements for the five year period from 1948 through 1952 and found that about $3½ billion dollars will be required. It is estimated that 1.8 billion dollars will be spent by gas companies in the next three years. Manufactured and mixed gas companies expect to spend $500,000,000 during the five year period, with natural gas utilities spending three billion dollars. Of this amount about 1.8 billion dollars will go for new natural gas transmission facilities.

Natural Gas Expansion

Expansion was again the keynote of the natural gas industry during 1949, continuing the spectacular growth begun at the end of the war. For the first time in its history, New York City was served with natural gas when the New York and Richmond Gas Co. of Staten Island started serving natural gas from the Gulf Coast of Texas.

The remaining boroughs of New York will begin receiving natural gas by the end of 1950 with the completion of the 1,840 mile pipe line now being con-





structed by Transcontinental Gas Pipe Line Corp. at a cost of about $190,000,000. This line, which will run from Texas to the Hudson River will supply 505 million cu. ft. of gas daily to metropolitan New York and Newark, N. J. Applications are pending before the Federal Power Commission to increase daily deliverability by 100 million cu. ft. and to extend the New York line to the New York-Connecticut border.

Several natural gas transmission companies are working on plans for bringing natural gas to the New England states. This highly industrial area now is served entirely with manufactured gas and the advent of natural gas may make important changes in the economic future of New England.

Another important extension is proposed by the Atlantic Gulf Co. which would bring a line from the Louisiana Gulf Coast to major cities in Alabama, Georgia, South Carolina and Florida.

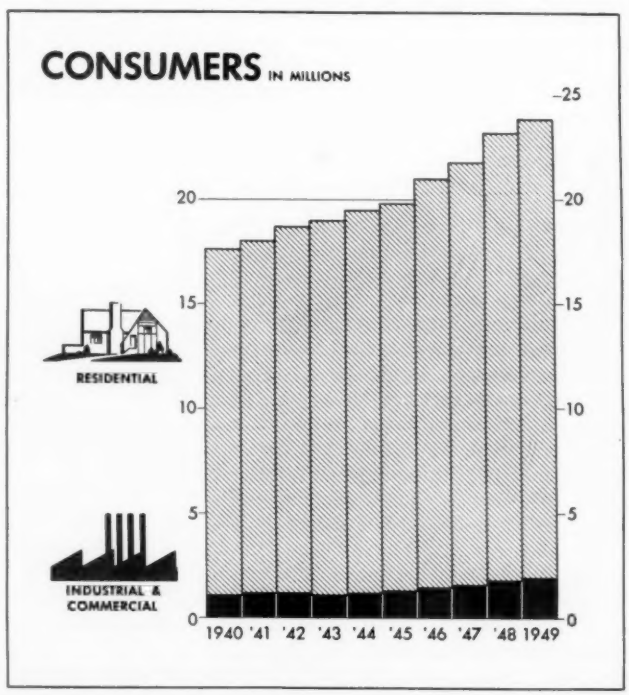
In the six months ended June 30, 1949, the FPC authorized construction of 4,900 additional miles of pipe line to cost about $374,820,000. Another 8,500 miles are now under construction and applications are pending before the FPC for about 14,600 miles. The present 260,000 mile network is delivering almost three trillion cu. ft. of gas annually.

Proved reserves of natural gas climbed to new high levels. The Association's committee on natural gas reserves estimated that proved recoverable reserves at the beginning of 1949 amounted to 173.8 trillion cu. ft., an increase of 7.9 trillion cu. ft. over the previous year. Production of natural gas jumped from 5.6 trillion cu. ft. in 1948.

Manufactured Gas

While demand for gas continued to exceed production capacity in a few manufactured gas areas, the majority of the companies ended the year with no restrictions. A survey recently conducted by the Association's bureau of statistics showed that more than 6,600,000 families now use gas for space heating and house heating and that it was expected that 693,000 new gas house heating customers would be added in the 1949-1950 heating season.

Catalytic cracking processes and high Btu oil gas processes discovered under the industry's research program are being integrated into plans of manufactured gas companies for meeting peak load problems. The advent of natural gas will be a boon to some manufactured gas areas. While it is not expected that consumer rates will be decreased appreciably, most manufactured gas companies by using natural gas to replace high cost and sometimes



The charts on this page, showing trends in sales, revenues, and customers, were prepared by the American Gas Ass'n. Data for 1949 are estimated.

scarce oils for enriching purposes will be able to provide better fuel at no additional cost and will be able to meet increased demands for service without expanding plants in a period of high construction costs.

AGA Laboratories

A new peak in the Laboratories services to the gas industry was established for the third successive year. Testing and inspection services, the major activities, exceeded those of the previous year by about 20 per cent. Operations totaled nearly a million dollars or approximately double that of the prewar peak of 1940. Additional personnel was employed, facilities were improved and added floor space purchased for the Pacific Coast branch was brought into full operation. The number of manufacturers obtaining approval for their products increased approximately 25 per cent and personnel was expanded to provide adequate inspection services.

Research activities were continued at about the same pace as last year, with some $160,000 in projects financed through the PAR Plan handled at the Laboratories. These included domestic, industrial and commercial, and mixed gas research activities. Fourteen bulletins and reports covering various phases of these projects were distributed to the industry.

Development of sales plans and methods was an important task of the Residential Gas Section during 1949. To coordinate most effectively the efforts of the Association and its member companies, long range planning was ini-

(Continued on page 40)

Manufacturers Expect 20% Sales Increase

by Stanley H. Hobson

President, Gas Appliance Manufacturers Association; President, Geo. D. Roper Corp., Rockford, Ill.

Stanley H. Hobson

SALES of gas appliances and equipment in 1950 will exceed 1949 totals and, in every division of the industry will far exceed, and in some classifications more than double pre-war averages, according to a recent poll made among the 550 gas appliance and equipment manufacturer members of the Gas Appliance Manufacturers Association. This will bring industry sales close to 1947-1948 all time peaks.

To reach these goals manufacturers will intensify sales training, improve dealers' sales aids and introduce more creative selling techniques among their dealers' outlets and salesmen. Approximately 50 per cent of the manufacturers polled intend to increase their sales forces.

Analyses of manufacturers' estimates of 1950 sales indicate an expected 20 per cent to 30 per cent increase in gas range sales over 1949. Greater increases are expected in the sales of incinerators, refrigerators and clothes dryers.

Sales of gas-fired central heating equipment, manufacturers expect, will be 30 per cent over 1949. Floor furnaces and direct heating equipment are expected to be about 20 per cent greater. Automatic water heater sales are also expected to make substantial gains.

Plans to increase sales forces vary widely among manufacturers. This is particularly true in the cases of the substantial number of new manufacturers who have recently entered the gas appliance and equipment field. In general, 54 per cent of the reporting manufacturers plan to increase their sales force by as much as 25 per cent. New manufacturers, particularly those making gas heating equipment, indicate increases up to 100 per cent.

As in most industries, 1949 gas appliance sales did not reach 1948 peaks with the exception of the heating appliance and equipment sections of the industry. However, in the last quarter new monthly sales records were made by practically every division of the gas appliance industry.

Extension of natural gas pipe lines, increases in gas manufacturing facilities and the increasing acceptance of gas for home heating aided the gas heating manufacturers to reach all time sales peaks which are expected to be exceeded in 1950 as additional transmission and manufacturing facilities are completed.

During 1949, gas furnace sales were 35 per cent above 1948; gas conversion burner sales were 500 per cent greater than during 1948; while gas heating boiler sales increased 30 per cent.

Orders for gas-fired central heating equipment continue to be received at a high rate and manufacturers report backlogs of orders more than double January 1, 1949. Unfilled orders for conversion burners are nearly 20 times greater than a year ago.

Manufacturers' shipments of gas ranges reached 2,000,000 units in 1949 and, while approximately 30 per cent below 1948, were 40 per cent above the 1936-1941 pre-war average. Sales showed steady increases each month from the January low, and in the fourth quarter exceeded 1948 levels. October shipments reach an all time industry high of 260,000 units.

Automatic gas water heater unit sales totaled 1,350,000 compared with 1,500,000 in 1948 and were three times greater than the pre-war average.

Shipments of gas-fired warm air furnaces totaled 260,000 units; gas boilers, 37,000 units; and gas conversion burners, 290,000 units. Floor furnace shipments amounted to 220,000 units.

Gas incinerators, gas clothes dryers, and gas-fired year-round air conditioners, comparatively new gas appliances, showed substantial gains over 1948.

Intensive sales promotion campaigns in which all segments of the industry cooperate were important factors in lifting gas appliance sales from the January and February low points. These sales programs will form the pattern for the industry-wide intensified sales activities planned for 1950.

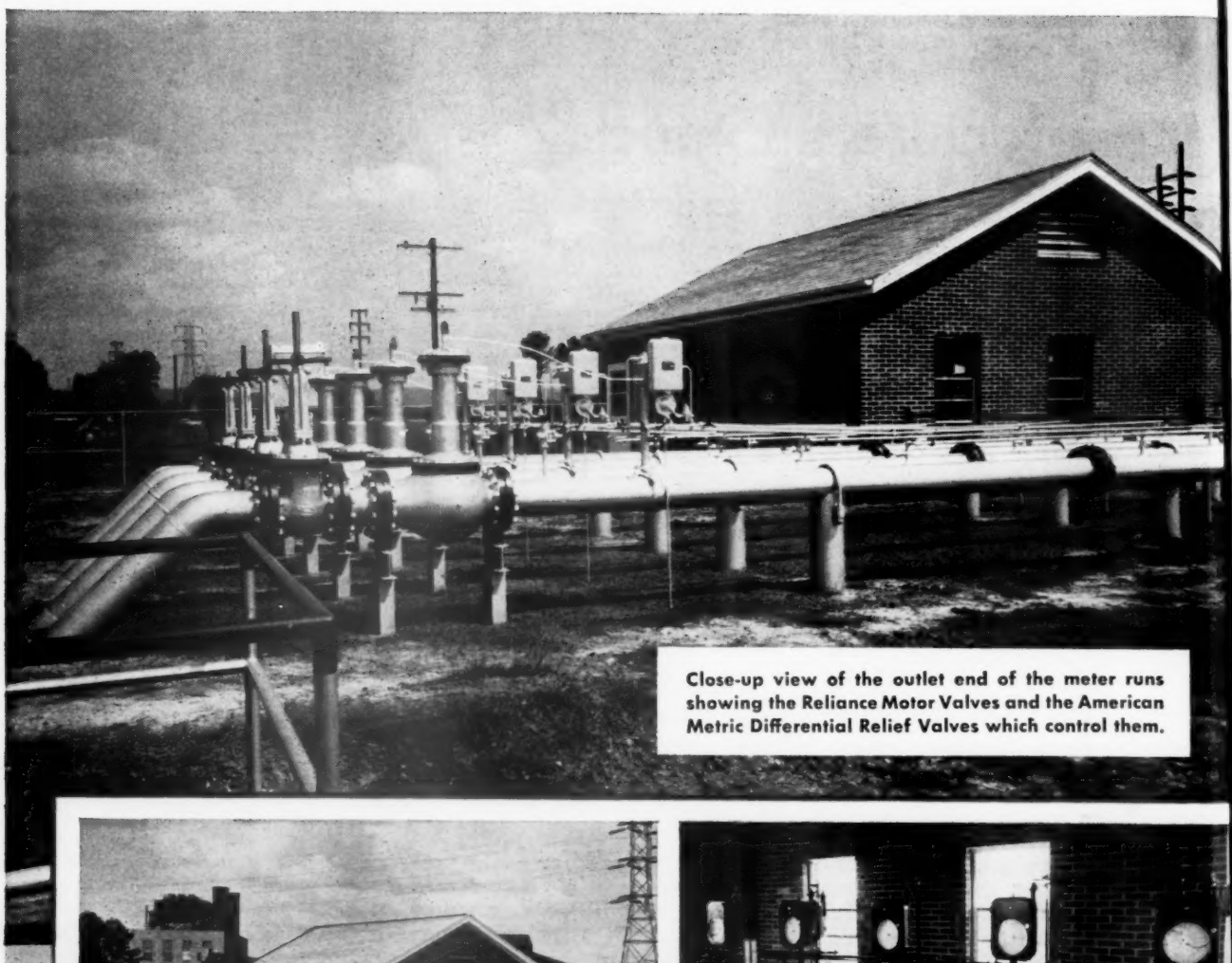
To raise the standards for automatic gas water heaters, to capitalize on the growing demand for adequate supplies of hot water in homes and to keep pace with the installations of automatic clothes and dish washers, the "Court of Flame" automatic gas water heater sales contest was launched by GAMA early in 1948. More than 13,500 retail salesmen entered the contest and competed for prizes.

To focus appliance dealers' and plumbers' attention on the advantages of automatic gas water heating and the sales possibilities in this appliance, a new seven-month "Court of Flame" contest will be launched in March, backed by intensive manufacturer and American Gas Association national advertising and strong gas utility, distributor, dealer and manufacturer local promotions.

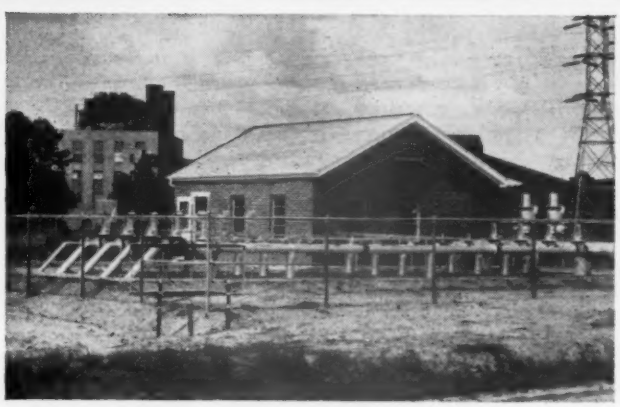
With the objective of selling 1,000,-

(Continued on page 41)

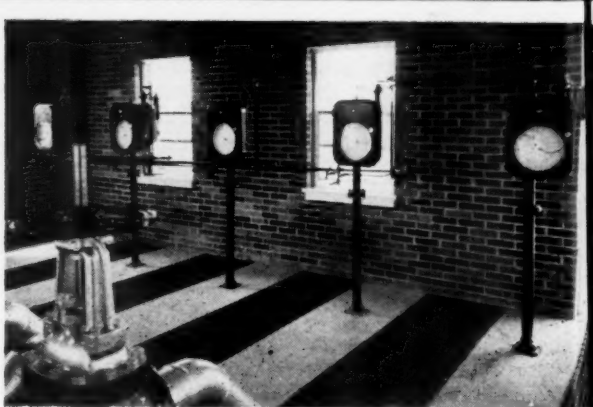
Automatically Measuring Demand Load of Southern



Close-up view of the outlet end of the meter runs showing the Reliance Motor Valves and the American Metric Differential Relief Valves which control them.



Exterior view of Southern Natural Gas Company's new measuring station for measuring deliveries of gas to the recently completed Gadsden Power Plant.



Interior of the Meter House showing the five 100" American Metric Orifice Meters which register the load measured on the meter runs.

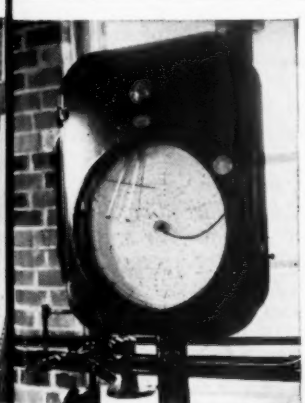
0 to 40,000,000 cu. ft. Natural Gas Company

Located on the banks of the Coosa River near Gadsden, Alabama, is the recently completed Gadsden Power Plant operating two 60,000 KWH steam generating units.

The Natural Gas to fire the boilers is delivered by the Southern Natural Gas Company through this new automatic measuring station on an interruptible basis which varies from 0 to 40,000 MCF per day.

Two 500 B American Ironcase Meters are located in the 2″ run for measuring the low load. This 2″ run is equipped with an orifice plate to which is connected an American Metric Differential Relief Valve which serves to open and close an 8″ Reliance Motor Valve in the No. 1, eight-inch run as required by increase in load. Eight-inch runs number 2, 3, and 4 are likewise equipped with Reliance Motor Valves operated by American Meter Differential Relief Valves serving to automatically open and close these measuring tubes according to requirements of the load conditions.

Metric Orifice and Displacement Meters together with Reliance Regulators and Valves, all products of American Meter Company, can be depended upon for safe, accurate measurement and control of gas under a variety of operating conditions. Write for full details.



Close-up of one of the 100″ American Metric Orifice Meters.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

60 EAST 42nd STREET • NEW YORK 17, N. Y. • Albany • Alhambra • Atlanta • Baltimore • Birmingham
Boston • Chicago • Dallas • Denver • Erie • Fort Lauderdale • Houston • Joliet • Kansas City
Los Angeles • Minneapolis • Odessa • Philadelphia • Pittsburgh • San Francisco • Tulsa
In Canada — Canadian Meter Co., Ltd., Hamilton, Ontario

Utilities, Customers and Investors Interested In Eastward Expansion of Natural Gas

by John F. Falvey

CONSIDERABLE interest has been evidenced in Transcontinental Gas Pipe Line Corp. which now is well along in construction of its pipe line to bring natural gas from the Southwest to the Middle Atlantic seaboard, to the Metropolitan New York area and possibly to New England.

This interest is three-pronged:

Residents of the area look forward to enjoying for the first time, late this year, the benefits of natural gas.

Public utility companies serving the territory—both manufactured gas companies and electric utilities—anticipate considerable savings in costs through substitution of the cheap natural gas for increasingly high cost oil in gas-making operations, and as a substitute for coal or oil as generating station fuel.

Investors in securities of utilities in the area, and holders of Transcontinental's own stocks, calculate the entry of natural gas into the Northeast on the basis of what it will mean in earnings and dividend payments on their investment.

The experience of Staten Island, one of the five boroughs of New York City, might give a clue as to what gas users in the communities still to receive natural gas can anticipate when that date is reached. New York and Richmond Gas Company, which serves Staten Island, reduced its rates by $232,000 a year following receipt of natural gas from Texas Eastern Transmission Corp. in the amount of 4,000,000 cu. ft. a day. The utility itself is realizing a greater return on its investment.

What the utilities serving gas in the New York area may be expected to save is indicated in the estimate just submitted to the Federal Power Commission by Brooklyn Union Gas Co.—about a 2/3rd greater saving than Brooklyn Union anticipated some months ago when oil prices were much lower. Making a similar adjustment to the figures shown on page 14 of the August 1949 issue of the AMERICAN GAS JOURNAL, the economies for the other New York utility companies can be calculated pretty closely.

Transcontinental Gas Pipe Line Corp. in the first full year of its operations in 1951 is expected to show a return of 5.07 per cent on a daily deliverability of 405,000,000 cu. ft. and of 5.96 per cent based on deliverability of 505,000,000 cu. ft. a day.

Both figures assume approval by FPC of 405,000,000 cu. ft. delivered to utilities aggregating 392.5 million cu. ft. a day (exclusive of Northeastern Gas Transmission Co., through which Transcontinental hopes to obtain a share of the New England market). They also assume a 65 per cent load factor for all companies except Public Service Electric and Gas Co. of New Jersey, which is 80 per cent, and take into consideration transportation of 20,000,000,000 cu. ft. annually for Sun Oil Co.

On this basis, Transcontinental estimates it will be able in 1951 to earn $1.01 for each of its 3,530,000 common

(Continued on page 28)

1950 Will Have Its Financial Problems

John F. Falvey

THE New Year marks an important turning point for gas company managements.

During the short space of the past two years, the gas industry has established two new records for expenditures on new construction. The record-breaking $943,000,000 paid out for the purpose in 1949 brought the two-year total to $1,713 million.

Commendable as the job has been, this is not the time for the industry to rest on its laurels. On the contrary, it will have to exercise the utmost vigilance if it is to obtain on a satisfactory cost basis its share of the available investment dollars.

To complete the five-year expansion to which it has dedicated itself, the gas industry in the next three years will have to spend another $1,787 million, the bulk of which will have to be raised through financing.

In its quest for this money, it will have to compete with many other segments of American industry—electric utilities, telephone companies and industrial firms.

Incongruous though it may seem, financial markets are using a two-way yardstick in their purchase of equities. In buying electric utility common stocks, they are doing so strictly on a yield basis. In purchasing gas stocks, on the other hand, they are stressing prospects primarily.

The security markets currently are very receptive to utility bonds and stocks. But since investors are stressing prospects in buying gas company stocks, managements in this industry will have to stress the outlook for their companies.

A yield will sell itself, because it is there for all to see, but prospects will have to be sold. This is the job of management.

Since investors are buying gas stocks on prospects, it will behoove management to tell investors just what continuing expansion will mean from the standpoint of increased earnings and dividend payments. These are the prime considerations of investors.

Index of Yields : Selected Utilities Stocks

THE most striking development of the past month has been the improvement in demand for common stocks of manufactured and mixed gas companies.

Measured by the AMERICAN GAS JOURNAL index, these shares now afford an average yield of only 4.75 per cent. This is the smallest return shown in years on stocks in this classification.

The reasons are not hard to find, despite the adverse effect on space heating gas sales of unusually mild weather which prevailed during closing weeks of 1949 in midwestern and eastern areas where these companies are predominant.

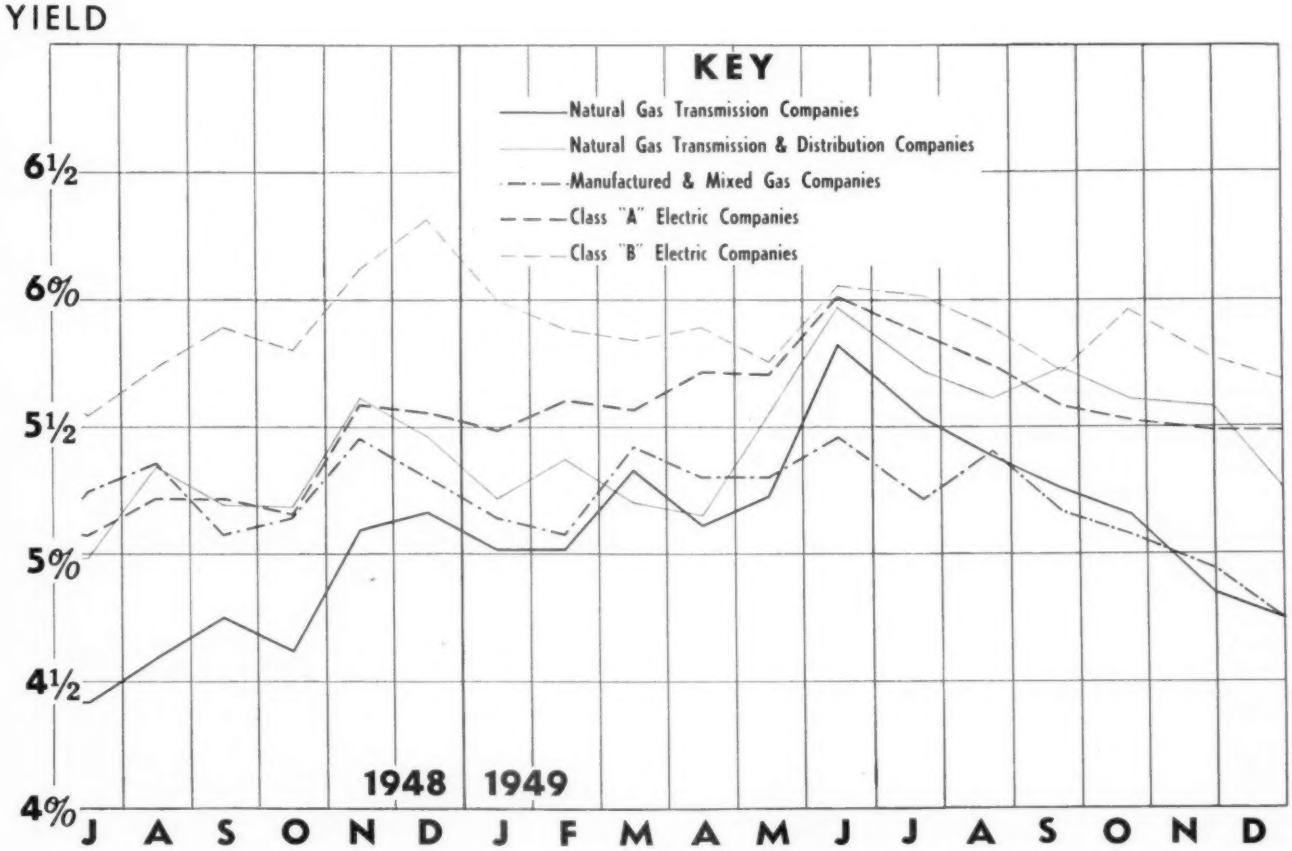
Revenues are reflecting increased rates and operating costs have been aided by lower prices for oil and for other materials entering into gas manufacture.

Investor interest in these shares has been heightened, moreover, by reason of the prospect for increased natural gas supplies in areas where that fuel now is available for mixing purposes, and by the imminence of its introduction in communities along the Eastern seaboard, which to date have not enjoyed the benefits of its low cost and high heating content.

One change has been made in the AMERICAN GAS JOURNAL index this month. Laclede Gas Light Co. has been omitted from the manufactured and mixed gas company group, since it changed to delivery of straight natural gas early last month. We have substituted for it the stock of United Gas Improvement Co., which for years has been one of the leaders in the manufactured gas industry.

This substitution has not lent any weight to the sharp reduction in yield obtainable in this portion of the index, because UGI at the time was affording a yield of 4.89 per cent at the prevailing price on its $1.30 a share annual dividend, or 14 basis points higher than the manufactured and mixed gas groups as a whole.

While their performance has not been as outstanding as the manufactured and mixed gas group, the natural gas stocks recently have continued their favorable trend. The return obtainable on the transmission company shares averages



Method of Compiling Index of Yields

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

The companies used in compiling this index are:

Natural Gas Transmission Companies: El Paso Natural Gas Co.; Northern Natural Gas Co.; Panhandle Eastern Pipe Line Co.; Southern Natural Gas Co.; Tennessee Gas Transmission Co.

Natural Gas Transmission and Distribution Companies: Columbia Gas System, Inc.; Consolidated Natural Gas Co.; Lone Star Gas Co.; Oklahoma Natural Gas Co.; Pacific Lighting Corp.

Manufactured and Mixed Gas Companies: Bridgeport Gas Light Co.; Brooklyn Union Gas Co.; United Gas Improvement Co.; Peoples Gas Light & Coke Co.

Class "A" Electric Companies: Boston Edison Co.; Commonwealth Edison Co.; Houston Lighting & Power Co.; Southern California Edison Co., Ltd.

Class "B" Electric Companies: Dayton Power & Light Co.; Hartford Electric Light Co.; Pennsylvania Power & Light Co.; Public Service Co. of Colorado; San Diego Gas & Electric Co.

only 4.75 per cent, the lowest it has hit since October 1948, and no slackening of the trend is in evidence. Shares of companies engaged in both transmission and distribution do not have far to go on their present course before breaking through to a new low yield basis.

Strength in the bond market is not to be overlooked as an important factor affecting utility shares. Going into the new year, investment underwriters had on their shelves a "float" or inventory of only about $15,000,000 of new corporate issues, of which the predominant proportion, or approximately $11,000,000, represented the unsold portion of the $12,500,000 issue of Central Illinois Light Co. 2⅝'s marketed on a 2.58 per cent yield basis.

Underwriters moved out without difficulty the inventory previously on their shelves and the present "float" constitutes no problem whatever, but merely gives them a cushion on which to work.

The feeling in the bond market is one of complete confidence in the outlook.

Utilities, Customers

(Continued from page 26)

shares. These estimated earnings will be lifted to $1.74 per common share on the further assumption that FPC approves capacity of 505,000,000 cu. ft. a day, which it was recently asked to do.

We have set forth here, in table No. 1, the anticipated earnings of the pipe line company for the year 1951 on the basis of each of the assumptions mentioned above.

It may be significant that despite the relatively high cost of its construction Transcontinental expects to go into operation with a smaller proportion of debt to total capitalization than several of the leading pipe line companies in the country currently in operation enjoy.

In its gas purchase costs, Transcontinental includes about half at a purchase price ranging from 7¢ in the first 2½ years to 12¢ in the last 3½ years in a 20-year period, and half at a price starting at 8½¢ and increasing 1¢ per Mcf each of the succeeding five years, with the final five years to be negotiated at a price of not less than 11½¢.

The company proposes to have its entire 505,000,000 cu. ft. a day available by December of this year.

Additional construction required as now foreseen will cost an estimated $44,650,000 exclusive of any connection with Northeastern. An estimated $32,000,000 of this cost would be provided from mortgage bonds, $10,000,000 from a bank loan, and $2,650,000 by sale of new common stock through exercise of warrants now outstanding.

In table 2 in approved form are the statistics for the line as now calculated for the first and fifth years of operation.

TABLE 1

	Year 1951 Assumption No. 1 Capacity 405 MMCF 2,200 Miles 100,160 Horsepower	Year 1951 Assumption No. 2 Capacity 505 MMCF 2,321 Miles 206,560 Horsepower
Utility Gas Sales	$ 31,221,000	$ 40,960,000
Transportation (Sun Oil)	4,400,000	4,400,000
	(Load Factor Totals 79%)	(Load Factor Totals 76%)
Total Revenues	$ 35,621,000	$ 45,360,000
Cost of gas purchased	6,903,000	8,383,000
Other Operating Costs, Taxes and Depreciation	17,779,000	22,718,000
Gross Income	$ 10,939,000	$ 14,259,000
Fixed Charges (Bonds & Bank Loan)	5,782,000	6,518,000
Net Income	$ 5,157,000	$ 7,741,000
Preferred Dividend Requirements $26,500,000 at 6%	1,590,000	1,590,000
Balance Available for Common Stock	$ 3,567,000	$ 6,151,000
Earned Per Share (3,530,000 shares)	$1.01	$1.74
Times Earned . . . Bond Interest Before Federal Taxes	2.56	3.07
Bond Interest After Federal Taxes	1.94	2.27
Bond Interest and Preferred Dividends	1.52	1.81
Preferred Dividends	3.24	4.87
Gross Plant	$213,593,000	$236,911,000
Working Capital	2,000,000	2,500,000
Rate Base	215,593,000	239,411,000
% Return on Rate Base	5.07%	5.96%
CAPITALIZATION DATA AT END OF CONSTRUCTION PERIOD:		
Bonds and Bank Loan	73.1%	75.8%
Preferred Stock	12.0	10.8
Common Stock and Surplus	14.9	13.4
	100.0%	100.0%

TABLE 2

	Assumption No. 1		Assumption No. 2	
	First Year of Operations	Fifth Year of Operations	First Year of Operations	Fifth Year of Operations
	(in thousands of dollars)			
Rate Base	$239,411	$210,951	$239,411	$210,951
% Return	5.1%	5.7%	6.6%	7.0%
Bonds Outstanding	$175,000*	$133,555	$175,000*	$133,555
% of Capitalization	73.9%	66.3%	73.9%	66.3%
Interest Times Earned Before Federal Taxes	2.51	3.30	3.43	4.18
Interest Times Earned After Federal Taxes	1.93	2.39	2.49	2.94
Interest and Preferred Dividends . . . Times Earned After Federal Taxes	1.54	1.82	1.99	2.24
Earned Surplus Available for Payment of Dividends on Common Stock (Per Share Based on 3,530,000 Shares)	$2.17	†$6.91	$3.81	†$11.62

* End of construction period.

† Accumulated to end of fifth year.

Two Stage Changeover Puts Minneapolis In Straight Natural Gas Ranks

by Geo. B. Johnson

Manager Customer Service, Minneapolis Gas Co.

Geo. B. Johnson

GAS conversion is the art of changing from one type of gas to another. With it, we are faced with the job of correcting appliances to utilize the new gas in an efficient and safe manner.

The difficult problem is "How are we going to accomplish the above and maintain customer satisfaction and safety?" It is obvious that where a distribution system can be sectionalized to distribute both types of gas and thus accomplish a changeover in a period of one day or so per section, then the "How" becomes simple. This method is called the *direct method*. Many gas utilities find it impossible to use this method because of the terrific cost to install additional valves and mains in order to sectionalize properly. When the direct method is ruled out, there remains the choice of the *pressure method* or *intermediate gas method*, or a combination of both. Before going into a study of the methods, I would like to relate our experience in two conversions, using the "pressure method" in the first conversion and the "intermediate method" in the second.

Our first conversion using the "pressure method" was used in 1935 when we changed from manufactured carburetted water gas of 550 Btu to a mixed gas of natural and water gas with a Btu content of 800 Btu and .7 gravity. In relating our experiences of this conversion I would like to give our method, procedure, results, our mistakes. In relating our errors, I wish to state that they are no reflection on any person or persons because in 1935 there was very little experience to be guided by. The persons who engineered and accomplished our first conversion did an admirable job when you consider the pioneering aspects.

Paper presented at meeting of Wisconsin Utilities Ass'n, Milwaukee, Nov., 1949.

1935 Conversion from 550 Btu Carburetted Water Gas to 800 Btu Mixed Natural and Water Gas of .7 Specific Gravity

The pressure method was decided on because the direct method was too costly. The pressure method consisted of dividing the city into 20 sections. In each district the pressure of the gas was raised from 6" to 9" over a period of three days prior to the arrival of conversion men. The conversion men converted appliances on a 9" pressure of manufactured carburetted water gas. The actual conversion in each district was completed in from three to four days. Notices to customers in each district were mailed on the day that the initial pressure raise was made informing them of our plans and to expect a conversion man in the next three or four days. They were instructed how to use their appliances in the meantime and to leave their keys with neighbors in case they were going to be absent.

The notices sent to customers informed them the flames would be somewhat higher than formerly and to turn down the gas on the following appliances:

A. Gas range, top and oven burners.
B. Hot plate and laundry stove.
C. Water heaters not located in bathrooms and if equipped with flue to carry burned gases off.
D. House heating equipment.

They were asked to shut off the following appliances until after the burner conversions had been made:

1. Instantaneous water heaters.
2. Water heaters located in bathrooms.
3. Water heaters not equipped to carry off flue gases to the outside.
4. Room heaters.
5. Clothes dryers.
6. Incinerators.
7. Mangle and ironers.
8. All other appliances not enumerated under A, B, C, and D above.

After the customers' appliances were converted, they remained on high pressure until all districts were converted. Then the mixed gas was turned on and the pressure lowered to normal (5" to 6") for the entire city. Substituting the new mixed gas and lowering of pressure were done over a period of two or three days.

Organization and Appliance Conversion Procedure

Approximately 400 men were used for the conversion. They were divided as follows:

Industrial crews—Two crews of 12 men and one crew captain.
Domestic crews—Forty-three crews of 6 men each—1 crew captain—1 special man and 1 complaint man.
Oil burners—12 special men.
Refrigerators—12 special men.

The industrial crews were all experienced conversion men using their own individual experiences.

The domestic crews were schooled and given the following procedure:

Domestic ranges—New fixed orifices were installed in all burners. On burners with screw back adjustment, the needle point was sawed off. Adapters were used on old orifice caps.

Orifices for top burners were sized according to giant top burners (52), small top burners (53), and simmer burners (72).

Oven orifices were sized according to the dimensions of the oven and the number of burners. They ranged from No. 36 to No. 49.

Laundry plates—Laundry plates were adapted with orifices from No. 52 to No. 56.

Refrigerators—Gas refrigerators were handled by special men who set the required input by using a flow meter.

Water heaters—Side arm heaters were adjusted by regular conversion men by inserting new plug orifices. The majority of heaters were of 24,000 and 35,000 Btu input and required No. 43 and No. 38 drilled orifices. Automatic heat-

ers and instantaneous heaters were converted by special men who used an orifice chart to set the required input as specified by the manufacturer.

Miscellaneous equipment—All miscellaneous appliances were converted by special men who used orifice charts for conversion. In case of some equipment such as dental torches, etc., the equipment was replaced entirely.

Drilling burner ports—Burner ports were drilled only in cases where enough primary air could not be admitted to prevent lifting of the flame.

Equipment repair—Special repair trucks were located at strategic points for the purpose of bringing in broken parts and returning parts.

Results of Conversion

The conversion was finished on schedule in four months and 800 Btu gas reached all sections of our city by June 1, 1935. The number of complaints received on the first day numbered 2200 which was 2000 in excess of normal. This number of complaints continued for four or five days and *gradually* tapered off to a constant of about 10 per cent above normal in two months. The 10 per cent above normal continued for about a year. The common complaint was that flames were high and smoky. The difficulty encountered in process of conversion was the adjustment of primary air so as to prevent flashback. Carburetted water gas at 9" pressure has a high primary air inspiration ability and in order to obtain good combustion, the conversion men had to close off the primary openings almost completely and in some cases they used cement to seal off the cracks. The final result was smoky flames when mixed gas was turned into the mains.

Mixed gas has a lower and less flexible port loading ability than manufactured gas and, therefore, all burners should have been drilled during conversion in order to burn the new gas properly and for a greater variation in primary air adjustments. The absence of re-drilled ports added materially to the number of smoky and insufficient heat complaints.

Changes That Would Be Made Today If We Were To Duplicate Our 1935 Conversion

1. All burners that could be drilled would be drilled to handle a port loading of from 20,000 to 25,000 Btu per square inch of port area. Burners that could not be drilled would be changed or the input reduced to conform to the above port loading.

2. Instead of the pressure method, we would use an intermediate gas of such gravity and Btu as to obtain a 10 per cent increase in input before conversion and about a 10 per cent reduction after the appliance conversion. This difference in input would be in effect only during the process of conversion. It is also possible that we would use a combination of an intermediate gas and a slight pressure change. Which of the two we would use would depend on actual field tests.

3. We would use recessed caps instead of adaptors for the following reasons:

a. Reduces labor of conversion.

b. Increases quality of conversion work and eliminates cocked orifices, etc.

c. Our past service work showed that adaptors, because of their protruding nipple, were natural grease and dirt collectors and caused plugged orifices, which increased service complaints. Housewives, in removing burners to clean, would invariably hit these protruding adaptors.

4. Triplicate orders for material accounting would be eliminated as the number of clerks required to handle this volume of work costs a great deal more than the material saved.

5. Conversion adjusters would be supplied with a greater variety of tools and given more schooling so as to convert any type of equipment. We would eliminate special men as this is costly due to duplicate trips. This is based on the fact that the fundamentals of conversion are the same for any equipment and the variations are only in the mechanics of locating the orifice, changing it, and finding out how the primary air adjustment is made. This eliminates the need for special men except for large industrial and pre-mix burners.

6. Sufficient orifice charts would be supplied so that the adjuster could convert by one of the following methods:

a. Number and size of ports.

b. Rated input by manufacturer.

c. Clocking of meter.

d. Comparative orifice chart in case any of the above could not be followed.

7. Advertising to accomplish two objectives:

a. Tell your customers why you are changing to a new type of gas. Word your announcements so the customer will not expect immediate savings and miracle appliance performance on the day that the new gas is turned into the mains. Tell them that eventually you hope to accomplish the above, but like everything else that is new and progressive, there is always an unforeseen wrinkle to iron out.

b. Give your customers a short story of how you intend to carry out the conversion, what you would like them to do or how they can help you, and ask for their cooperation. People are most cooperative if you give them half a chance.

Statistics

Number of men used—400.

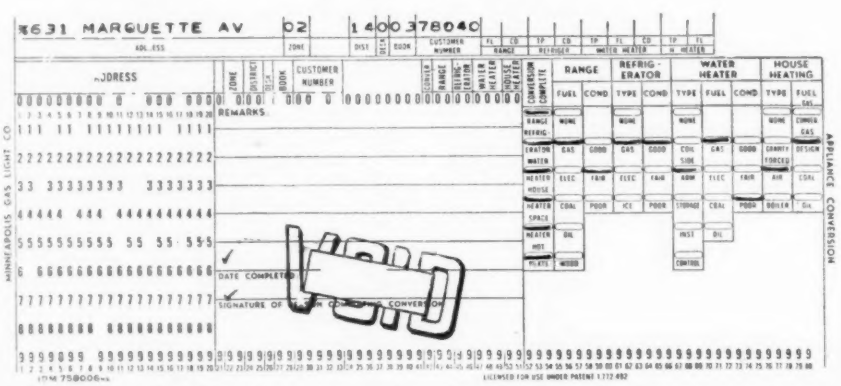
Number of meters converted—120,000.

Conversion time—3 months.

The records of all other items are unavailable at the present time.

The second Minneapolis conversion was from an 800 Btu mixed natural and manufactured gas of .7 gravity to 1000 Btu straight natural gas. This conversion was simpler in procedure than our first because it meant only a change in Btu content. The gravity and burning characteristics of our mixed and natural would be practically the same. The mechanics of the second changeover were more complicated than the first because of the great increase in automatic appliances and the addition of 40,000 house heating customers. The actual mechanical procedure required the following:

1. Drill ports to proper port area.
2. Change orifice.
3. Adjust primary air.



Reproduction of IBM mark sensing card used to keep record of appliances in each household.

STRAIGHT NATURAL GAS COMES TO MINNEAPOLIS TOMORROW

By tomorrow, every Gas appliance in the territory served by Minneapolis Gas Light Company will have been adjusted for straight Natural Gas.

Starting tomorrow, all customers of this Company will be supplied with straight Natural Gas in place of the mixed natural and Manufactured Gas previously used.

It is our established policy to see that your Gas appliances always operate to your full satisfaction. If they need readjustment at any time, simply call our Service Department, MAin 5133, and we will promptly adjust them free of charge.

We are grateful for the courteous cooperation you have extended to our conversion men. In return, we pledge continued expansion and improvement of our facilities—as rapidly as material shortages permit—to meet the ever-increasing demand for Gas—the clean, modern fuel.

MINNEAPOLIS GAS LIGHT COMPANY

Marquette at Eighth . . . Telephone MAin 5133

Natural Gas Conversion

This summer, as the latest step in a continuing program of progress, your Gas Company is changing over from the present mixture of natural and manufactured Gas to straight Natural Gas.

To use the new Gas efficiently, your appliances will need certain adjustments.

Crews of specially trained "conversion men" will visit every Gas-using home and business establishment in our territory to make the necessary adjustments. It will take them several months to cover the entire city and suburbs.

YOUR GAS APPLIANCES WILL BE CONVERTED FREE OF CHARGE

There will be no charge for the conversion service. The adjustments to be made in your appliances are simple but necessary. Your cooperation in receiving our conversion man will be greatly appreciated.

If, during the conversion period, any one of your appliances does not work properly, just call our Service Department, MAin 5133, and we will correct it immediately without charge.

NOTE: For your protection, each of our conversion men will carry an identification card.

MINNEAPOLIS GAS LIGHT COMPANY
MARQUETTE AT EIGHTH TELEPHONE MAIN 5133

Newspaper advertisements used by the company during conversion period. Right: the first announcement, and, above, the final one.

Our procedure and preliminary work was simplified because of the similarity of the two gases and, therefore, we had only to determine how high in Btu we could increase our present gas so as to have an intermediate gas on which to carry out our conversion work. By laboratory experiments and by field tests we found that 875 Btu was the limit and this limit was set by Servel burners and other like burners. Above 875 Btu we started to obtain aldehyde odors on Servel burners. Other burners would take 900 Btu without too much difficulty. The 875 Btu intermediate gas would give an increase of 9.4 per cent in input to the customers' appliance before the conversion man arrived and a decrease of 12.5 per cent input after the adjuster had made his conversion.

Advertisements were run in all newspapers telling the customer how we were making our conversion, to expect a little higher flame before our adjuster arrived, and to expect a smaller flame after the adjuster had converted the appliance. They were told that the work would take six months and their appliance might be converted in the first or the last week, depending on their location in the territory.

When conversion was completed, another advertisement announced the completion of conversion and that the next day they would have straight natural gas. They were also asked to call our service department if their appliance did not function properly.

The conversion men also carried a small notice which told the story of our conversion. This was given to people who did not see our advertisement and left in homes where the party was not present while our adjusters converted their appliances.

A preliminary survey of appliances was not actually made because of our time limit. We did the next best thing which was to list all of the various types of appliances. We then called in a group of service men and asked them how many times out of 100 they worked on a certain manufacturer's appliance. From these data and the number of meters, we worked up an appliance total. We obtained data on house heating equipment quite accurately from our tabulation of cards which are kept on installations. With these two totals we were able to work out a material and tool list. This method of survey turned out quite well as we were never short of any material and our inventory at the end of conversion totaled about $10,000 which was less than 10 per cent of our total material costs.

Organization and Appliance Conversion Procedure

Two hundred men were hired and trained in a one-week school. The men were eventually assigned into 21 crews. One crew was assigned to each meter district (20 meter districts) and one special crew was picked for large industrial conversion. Twenty-five service men were picked to act as crew foremen. Twenty-one were actually assigned, leaving four extra for vacations, sickness, and spot inspections.

At the start of the conversion, each foreman started with three men. Each week thereafter we assigned two new men to each district (40 men schooled per week) until the crew was up to full strength, which was from eight to 10 men. This procedure enabled our crew foreman to concentrate his attention on each new man for the first three days.

Each foreman was supplied with IBM mark sensing tabulating cards which carried the customer's address and account number. The mark sensing tabulating cards were designed so that the conversion men would mark the types

of appliances he converted and would also mark other types of appliances in the household. The reason for this was to supply our sales department with statistical data for future sales promotion.

The crew foreman made one trip per day into headquarters for the purpose of turning in time cards, previous day's orders, pick up next day's orders, and stock his conversion materials which he carried in his car. The completed orders were tabulated once a week and from this a weekly progress report was made for each crew. This progress report contained the following information:

1. Number of ranges converted.
2. Refrigerators converted.
3. Water heaters converted.
4. House heaters converted.
5. Space heaters converted.
6. Hot plates converted.
7. Industrial jobs converted.
8. Mangles converted.
9. Incinerators converted.
10. Clothes dryers converted.
11. Miscellaneous equipment converted.
12. Man days.
13. Orders per man day.
14. Complaints.
15. Per cent of complaints to completed orders.
16. Per cent of conversion completed, based on an estimated 150,000 orders.
17. Total appliances converted.
18. Total time in hours.
19. Average time per appliance conversion.

The weekly progress report carried the above information on a current total, previous total, and total to date. In the case of master meters the conversion men made out a red-stripped card for customers not accounted for by our tabulating department. The above information was obtained by use of IBM tabulating machines and the total office help required to keep time, answer telephones, and obtain the above information, was six men.

Appliance parts broken in the field were repaired at our service building. The crew foreman brought in parts to be repaired on his regular daily trip and repaired parts were installed by our regular service man.

The crew foremen met once a week at a scheduled time for the purpose of discussing weekly progress reports, minor changes in conversion procedure, and to iron out any labor grievances. This weekly meeting proved to be very valuable in obtaining cooperation and correcting errors.

The extra conversion foremen who were used to spot check were in contact with the crew foreman directly whenever there were discrepancies or curbstone conversion. This method proved very satisfactory in maintaining discipline and high worker morale.

Each conversion man was schooled for 60 hours before being sent to a crew. The classroom instruction included 30 hours on theory, controls and mechanics of conversion, followed by 30 hours of actual laboratory practice on various appliances.

A conversion manual was given to each man which gave him the fundamentals of each type of appliance and also contained the following charts:

1. Top burner chart which designated the correct orifice according to size and number of ports.
2. Orifice size chart according to number of ports and port size.
3. Comparative orifice chart which gave the new orifice size corresponding to the old orifice. This chart was to be used only when no other method was available.
4. Input chart. Input based on orifice size and pressure.
5. Refrigerator input and orifice chart.
6. Meter time chart for determining input by clocking meter.
7. House heating chart giving the make of burner or furnace, its present orifice type, orifice procedure and mechanical procedure.
8. Chart giving tap and drill sizes.
9. Oven burner chart.
10. Charts on lighting instructions for all types of heating plants.

Conversion men were instructed to ask neighbors about all "Can't Get Ins" and to make a call back that evening and the next morning before sending the order back to his foreman. By this method the total "CGI's" totaled 5,237 for the entire conversion which amounted to 3.2 per cent of the total orders. The "CGI's" were re-worked at the end of the conversion and a special delivery letter sent to the remaining (about 1000) asking for a definite date.

Conversion Results

The conversion was finished on schedule and natural gas was turned on November 1. The number of complaints received on the first day were nil and we estimate the number of complaints above normal for two months after conversion totaled about 1000 for the entire two months, or .6 of 1 per cent of the number of customers. The total number of complaints directly attributed to actual faulty conversion during conversion totaled 808, or .5 of 1 per cent of the number of customers.

From an analysis of our normal service complaints during conversion we found that our complaints increased 12 per cent while conversion was going on. The increase was 8,000, and half of the 12 per cent increase was psychological complaint or customers who just thought that their appliances were not converted correctly. The other 4,000 were minor adjustments due to the conversion men's lack of field experience.

Statistical data for this conversion is as follows:

Number of meters converted	135,908
Number of customers converted	163,718
Number of appliances converted	370,812
Number of appliances per meter	2.7
Note: Difference between number of meters and customers is due to master meters.	
Customers per meter	1.2
Cost of conversion:	
Direct labor	$555,918
Materials and tools	122,805
Complaint service (Handled by regular service men)	16,000
Broken parts service (Handled by regular service men)	10,000
Total cost	$704,723
Cost per meter	$5.19/meter
Cost per customer	$4.31/customer
Cost per appliance	$1.90/appliance
Number of man days (10 hr. day)	27,995
Number of man hours	279,950
Man hours per meter	2.06
Man hours per customer	1.71
Man hours per appliance	0.75
Number of appliance parts broken or brought in for repair	4,750
Number of appliance parts broken or brought in for repair per meter	0.035

Changes That Would Be Made Today If We Were To Duplicate Our 1947 Conversion

The only changes that we would make on a duplicate of our 1947 conversion are:

1. On our tabulating cards we would divide our water heaters into automatic and non-automatic for sales and service statistics.

2. We would supply our men with small machinist vises so as to enable them better to drill orifice caps. This would prevent crooked orifices.

There are various procedures that can be used for conversions. The question is what method is best for my company? No one is better qualified to determine the best method than you because of your intimate knowledge of your distribution system and pressures used, service policy, types of appliances, and physical characteristics of your

present gas. The fact that you have the same type of gas now as some other company and are changing to a similar type of gas does not preclude that you can use the same procedure with equal success. The reasons for this are many:

1. Btu may be the same but gravities different.
2. Btu and gravity may be the same, but composition different.
3. Distribution system varies and also pressure.
4. Types of appliances may vary.
5. The present average port area loading (Btu per square inch of port area) varies from town to town because of difference in service policies.

For example, let us assume that two towns are distributing carburetted water gas of 550 Btu and .68 gravity. This would be gas No. 8 in AGA Bulletin No. 10. Looking this gas up on the lifting and yellow tip limit curves we will find that we can have a port loading of 65,000 Btu per square inch of port area and primary air per cent can vary from 32 to 74 per cent without lifting or yellow tips. This explains why manufactured gases are so much less critical in their air adjustments than other gases. Let us also assume that both towns have made a survey with the object of trying to determine what their average port loading is. We will also assume that town A found their port loading to be 50,000 Btu per square inch and town B found their average port loading to be 30,000 Btu. Both towns are converting to natural gas of 1000 Btu and 0.676 gravity. Although both companies have similar gases to start with and are converting to the same gas, they will have to vary their procedure in order to compensate for their difference in port loading.

If you look at the yellow tip and lifting curves for these gases, you will see that town B can use more natural in their mixture because their primary-air per cent and input rate point will be further to the left.

The above is brought out only to emphasize the point that when you study the use of an intermediate gas, the basic consideration should be "What is my present average port area loading?" When you know this you can calculate and then experiment with the various different mixtures of natural-manufactured gases that will give you the best results as an intermediate gas. After this is done, you can calculate what your input and air-injection rates will be before and after an appliance is converted. Applying these calculations to the proper curve for your intermediate gas you can determine approximately what trouble you will have in adjustments during conversion and what to expect when the final gas is turned on.

Example—Let us assume you now have a 550 gas of .4 gravity and you are converting to natural of 1000 and .7 gravity. We will also assume that you have determined that a 50-50 mixture may be an intermediate gas that can be used. This will give you a gas of 775 Btu and .55 gravity. Before appliances are converted you will have the following conditions:

1. Input rate $= (\overline{/.4/.55}) \times (775/550) \times (100) = 120\%$ or a 20% increase in input rate.
2. Air inspiration $= \overline{/.55/.4} \times 100 = .74/.63 \times 100 = 117\%$ or 17% more air will be inspirated, but since our input rate increased our primary-air ratio will decrease and our flame soften.

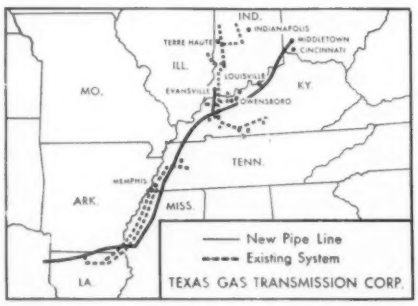
Flames that are set on the hard side will be OK but flames which are now too soft will turn yellow and you can expect service calls.

After appliances are converted you will have the following conditions:

1. Input rate $= \overline{/.7/.55} \times 775/1000 \times 100 = .84/.74 \times 775/1000 \times 100 = 88\%$ or a decrease of 12% in input rate.
2. Air inspiration $= \overline{/.55/.7} \times 100 = .74/.84$ or 88% of the requirement

(Continued on page 41)

Texas Gas Completes New 26-Inch Pipe Line



The country's newest long-distance pipe line went into operation on Dec. 22 as Louisville Gas and Electric Co. received the first delivery of natural gas from southwest gas fields through the new 26-inch line of Texas Gas Transmission Corp.

The new transmission line, built in less than eight months, is the longest constructed and put into operation during 1949. It will have an initial capacity of 304,000,000 cu. ft. a day when completed to Middletown, Ohio, in January. This will be increased in 1950 to 400,000,000 cu. ft. a day.

Deliveries have started to other utilities along the line, and will begin in January to Texas Eastern Transmission Corp. for transmittal to subsidiaries of the Columbia Gas System and Consolidated Natural Gas Corp., and to other northeastern utilities.

The new line was built at an approximate cost of $73,000,000.

Louisville Gas and Electric received its first gas from Southwest fields as part of a contract under which it receives up to 20,000,000 cu. ft. a day during the first year of the new line's operation, 30,000,000 a day during the second year, and 40,000,000 thereafter.

Other utilities will benefit by the start of operations of the new gas artery. Existing customers of Texas Gas serving more than 115 large and small communities will receive approximately 120,000,000 cu. ft. a day more than their present supplies. These utility customers include the Light, Gas and Water Division of the City of Memphis, Mississippi Power & Light Co., West Tennessee Gas Co., Southern Indiana Gas & Electric Co., Western Kentucky Gas Co., and Indiana Gas & Water Co.

New customers of Texas Gas that will receive natural gas for the first time when connections are completed to their systems from the new line include Kentucky Utilities Co. (Paducah, Ky.), Tennessee Gas Co., Corporation of Dyersburg, and Madison Utilities Corp.

When the new line is completed late in January to Middletown, Ohio, Texas Gas will be ready to deliver to Texas Eastern initial minimum quantities of 123,000,000 cu. ft. a day, which will be increased by the addition of compressor horsepower to 235,000,000 a day by mid-1950. Texas Eastern will sell this amount through a new loop line in Ohio to the East Ohio Gas Co., serving Akron, Canton, Cleveland, and Youngstown, Ohio; The Manufacturers Light and Heat Co. and the Ohio Fuel Gas Co., which serve numerous communities in Ohio, Pennsylvania and West Virginia; and Philadelphia Gas Works, Consumers Gas Co., Allentown-Bethlehem Gas Co., Harrisburg Gas Co., and National Gas & Oil Co.

Ten compressor stations with a total of 68,800 horsepower will push gas through the new line.

With completion of the new 800-mile line from Carthage to Middletown and addition of compressor horsepower, Texas Gas will have by the middle of 1950 a pipe line system totaling 2,400 miles of pipe with total capacity of over 650,000,000 cu. ft. of gas a day.

Legal Decisions Clarify Liability for Injury In Motor Vehicle Operation

by Leo T. Parker

Attorney at Law, Cincinnati, Ohio

SINCE all gas companies utilize motor vehicles, quite naturally a common source of litigation involves injuries resulting from the operation of these vehicles. Therefore, it is interesting for the officials, managers, and employees of gas companies to know that recently the higher courts in different localities rendered several outstanding decisions, explaining important phases of the law from which may be determined how to avoid liability for injuries caused by motor vehicles.

First, it is important to know that the courts have consistently held that gas companies are not liable for injuries caused by a motor vehicle *not* being operated at the time of the injury by a legal agent of the company. Hence, a gas company is not liable for injuries effected by a regular driver who acts outside the scope of his authority or employment, as where he deviates from a regular route, or uses the vehicle for his own pleasure or purpose. Quite obviously one who uses a vehicle without authority, as a thief or one to whom the gas company's regular driver loans the truck, is not a legal agent and the company is not liable for negligent acts of such persons.

Also, the higher courts have consistently held that if the driver of a motor vehicle signs a contract in which it is agreed that he will not permit strangers to ride on the truck, or permit any person to drive the truck, and further that he will use care when driving the truck, the gas company may avoid liability for injuries resulting from failure of the employee to comply with the terms of the contract.

A review of recent higher court cases indicate that the chances of liability may be importantly reduced if gas company officials have motor truck drivers sign a contract containing a clause as follows:

"I, the undersigned, being employed by *(name of gas company)* hereby agree that I will not allow anyone to ride on the truck which I am employed to operate, other than authorized helpers. Also, I will abide by laws and ordinances, and will not use the truck for my own purpose or pleasure. *(Driver signature.)*"

If a truck driver disobeys these instructions, the gas company ordinarily is not liable for injuries. This is so because a majority of courts hold that where the driver of a motor vehicle disobeys instructions, the gas company is not liable because the employee acts outside the scope of his *known* authority. See White, 165 Ala. 230.

Street Excavations

Considerable discussion has arisen from time to time over the legal question: Under what circumstances is a gas company liable for injuries to occupants of an automobile caused by an excavation made in a city street? The answer is: The gas company is liable *only* when negligence of the gas company's officials or employees caused the injury. In other words, if the gas company's employees exercised the same degree of care that would have been exercised under the identical circumstances by reasonably careful and prudent persons, there is no liability.

For example, in Atlanta Gas Light Co. v. Mills, 51 S. E. (2d) 705, reported April, 1949, the testimony showed facts, as follows: The Macon Natural Gas obtained permission from a city to cut into the pavement with an understanding that the places dug out would be kept in a proper state of repair and in a safe condition until the pavement was replaced.

An automobile driver was seriously injured when he applied his brakes to prevent a collision with a truck and his automobile did not stop, but skidded into the truck. The injured driver testified that the gas company's employees had made a cut in the street, and dirt, rock and pebbles had been scuffed out of this hole by automotive traffic so that in places the hole was lower than the pavement and the uneven surface caused his car to skid, and the pebbles and rock on the paved surface, which had come out of the cut, caused the brakes on the car not to hold. In other words, the injured driver contended that the gas company's employees were negligent (a) in making the excavation without filling it with some substance, as asphalt, that would make it smooth and even with the pavement; (b) in failing to keep the excavation free of holes and in a proper state of repair until the pavement was replaced; (c) in permitting gravel to be dug out of the excavation by trucks and vehicles; and (d) in failing to put up barricades, flares or warning signs to protect the public from the dangerous condition. The court held:

"If this defendant (gas company) was negligent it is for the jury to say whether it should have foreseen within the meaning of the law the possibility of some harm or injury to some person, including the plaintiff (driver) as a natural result of its negligence."

For comparison, see Williams v. Grier, 196 Ga. 327. This court held:

"In order that a party may be liable in negligence, it is not necessary that he should have contemplated or even been able to anticipate the particular consequences which ensued, or the precise injuries sustained by the plaintiff."

Truck Is Hired

It is a well-settled rule of law that when a gas company hires or lends its employee to another, and does not resign *full* control over him to the borrower, the employee remains a legal employee of the gas company. Hence the latter is liable in damages for injuries caused by negligence of the employee, or if the employee himself is injured the gas company is liable for payment of compensation.

In Pritchard v. G & A Truck, 18 N. W. (2d) 852, reported July 1946, it was shown that a truck driver was killed while driving a truck owned by G and A Co. and hired to Midwest Co.

The testimony showed that the driver was *not* under full control of the Midwest company on the fatal trip. Therefore, the higher court held the G and A company liable for payment of compensation to dependents of the deceased driver.

This same law is effective when the truck driver causes an injury to others. The original employer is solely liable if he retains control of the employee.

Conflicting Testimony

Considerable discussion has arisen from time to time over the legal question: If there is conflicting testimony or doubt that a gas company's motor vehicle was being operated by the company's legal agent at the time of an injury, what legal procedure is used as a basis for deciding liability?

The answer is: The jury must decide the issue in accordance with instructions given by the judge of the court.

For example, in Gette v. Carolina, 43 S. E. (2d) 472, reported July, 1947, it was shown that a gas company's motor truck collided with another vehicle seriously injuring its driver named Gette, who sued the gas company for damages. There was considerable conflicting testimony presented to the jury. The judge of the lower court instructed the jury, as follows: "I charge you that . . . you would have a right, (to hold the gas company liable) if satisfied that a gas truck of the gas company was operated by the gas company's agent in a negligent manner . . . but, as I said, in order to find a verdict against this particular truck (gas company) you must be satisfied by the greater amount of the truth that this particular truck was operated negligently and caused the injury. . . ."

The jury held the gas company liable for several thousand dollars damages. The gas company appealed to the higher court which, however, approved the verdict, and said:

"There was ample testimony from which a reasonable inference could be drawn that a truck belonging to the appellant (gas company) and operated by one of its agents in the course of its business was negligently and carelessly operated resulting in the injuries to the respondent (Gette)."

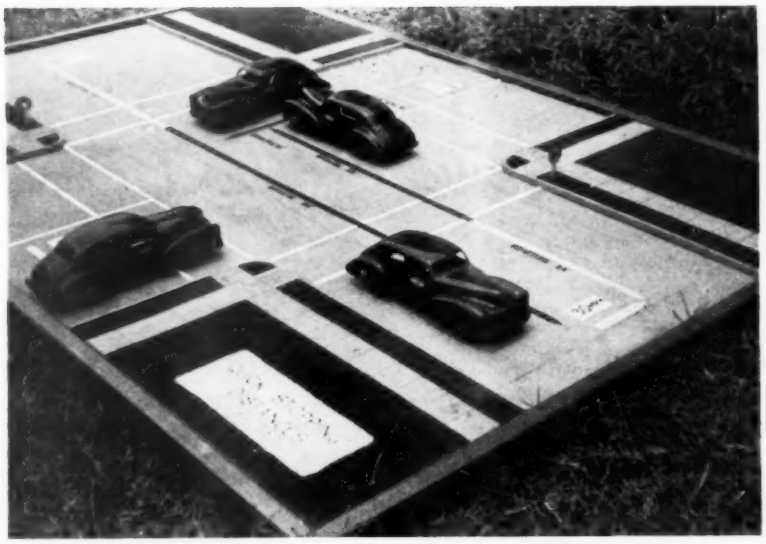
Court Approves Jury's Verdict

Generally speaking, a higher court will approve a jury's verdict, although in doing so it may disregard or disbelieve testimony of one of the litigants.

For example, in Brown v. Wyoming Gas Co., 205 Pac. (2d) 116, reported June 1949, it was shown that a motor truck owned by a gas company collided with another truck while both vehicles simultaneously were attempting to cross a narrow bridge coated with ice.

The driver of each vehicle testified that the driver of the other vehicle was negligent because he was driving so fast the brakes would not stop the truck on the icy highway. The jury held the gas company liable. The higher court approved the verdict, saying:

"There was substantial evidence which if believed by the jury, enabled it properly to find that the driver of defendant's (gas company's) vehicle was negligent in not keeping it on its own side of the highway and also that the driver of that vehicle was negligent in driving his vehicle upon the bridge at a speed greater than was 'reasonable and prudent under the condition then existing'—a wet, icy, and slippery surface—and that these acts of negligence proximately caused the accident."



c *United Gas Log.*

Constructed by Bert Ragsdale of the San Antonio district of United Gas Corp., the safe driving display board pictured shows quick stopping distances at various speeds. The display, mounted on a 36 by 48-inch board, is a scale model of a street intersection. Cars are painted company green and bear company insignia.

Relatives' Testimony

Modern higher courts consistently hold that testimony given by relatives, in favor of one being sued, is not to be given much weight or authority.

For example, in Mitchell v. Interstate Natural Gas Co., 37 So. (2d) 552, reported February 1949, it was shown that the rider, named Mitchell, of a motorcycle was severely injured from a collision with a truck owned by Interstate Natural Gas Co. The testimony showed that the motorcycle turned and attempted to cross the highway in front of the oncoming truck. Mitchell, the motorcycle rider, sued the gas company for heavy damages.

During the trial both Mitchell and his uncle testified that Mitchell had "straightened out" on the highway when "all at once the truck whipped over to the left hand side of the road, and ran head-on into the motorcycle." The driver of the gas company's truck testified that Mitchell did not drive straight forward but suddenly turned in front of his motor truck, which was on the right side of the highway. No person excepting Mitchell's uncle witnessed the collision. The jury believed the testimony given by the gas company's truck driver and held the gas company not liable, saying:

"The only eye witness to the accident who gave testimony favorable to plaintiff's contentions was Mr. Fowler, his uncle."

Independent Contractor Law

Considerable discussion among courts involve the answer to this legal question: Under what circumstances is the driver of a motor vehicle an independent contractor? The answer to this question is important for these reasons: First, a gas company which employs an independent contractor is not required to pay either unemployment or insurance under the State Workmen's Compensation Act for the employee; second, the company is not liable in damages for injuries to persons and private property caused by negligence of an independent contractor; and third, the company need not pay social security and like taxes on an independent contractor.

For illustration, in Cooper v. Colonial Co., 51 S. E. (2d) 889, reported April, 1949, it was shown that the Colonial company furnished to an employee a vehicle used in connection with delivery of accessories. The employee was under orders of a company official. While the employee was engaged under this arrangement, the legal question arose whether he was an independent contractor.

The higher court decided that the employee was not an independent contractor, and said:

"It is well settled as a general rule that an independent contractor is one

(Continued on page 46)

News of the Gas Industry

L. A. Kraemer Is Named Koppers Operations Engineer

Leo A. Kraemer, former superintendent of the by-product coke division of the Pittsburgh Steel Co., has been named operations engineer for the Engineering and Construction Division of Koppers Co., Inc., Joseph Becker, vice-president and division general manager, announced recently.

Mr. Kraemer joined the operating department of Koppers Construction Co. in 1917, after spending a year with the Laclede Gas Light Co. of St. Louis.

He left Koppers in 1933 to take the post of assistant coke plant superintendent at the Steubenville plant of the Wheeling Steel Corp. From 1941 until he returned to Koppers in 1949, Mr. Kraemer was superintendent of Pittsburgh Steel's By-Product Coke Division at Monessen, Pa.

During 1946 and 1947, Mr. Kraemer was president of the Eastern States Blast Furnace and Coke Oven Association.

Philadelphia Coke Co. Promotes F. D. Miller and J. P. Templin

W. B. Ross, President of Philadelphia Coke Co., subsidiary of Eastern Gas and Fuel Associates, has announced the appointment of Forrest D. Miller to superintendent of manufacture of Philadelphia Coke Co. and James P. Templin to assistant superintendent.

Mr. Miller succeeds A. C. Sedlachek, former superintendent at the coke plant, who has been promoted to engineer in the engineering and research division of Eastern Gas and Fuel Associates and who will transfer to the home office of the parent company in Boston. Mr. Sedlachek will work under the supervision of William H. Earle, formerly president of Philadelphia Coke Co., who resigned recently to become vice-president of Eastern Gas and Fuel Associates in charge of engineering and research. Mr. Earle also recently transferred to the Boston Office of the parent company.

Mr. Miller was employed by Philadelphia Coke Co. in 1929 as a general foreman and became head of the by-product department in 1930. He was appointed assistant superintendent of the coke plant in 1942.

Mr. Templin has been employed with the company since 1942. He has held positions as assistant engineer and chemical engineer before becoming assistant superintendent.

Boston Consolidated Makes Personnel Shifts

Andrew W. Johnson

Frank L. Corcoran

M. Frank Knoy

Major personnel and organization changes in the Boston Consolidated Gas Company's production, distribution and engineering departments have been announced by E. H. Eacker, president.

Andrew W. Johnston, formerly of the Washington Gas Light Co., Washington, D. C., comes to Boston Gas as engineer of distribution, and Henry R. Condon, formerly superintendent of mains and supplies, is promoted to assistant engineer of distribution.

Frank L. Corcoran, who has been in the production department since 1942, is promoted to engineer of production and construction. Claude F. Machen, superintendent of the Charlestown Electric Division of the Boston Consolidated, will be the electric division's department head and assistant to Mr. Corcoran. Stanley Davis will succeed Mr. Machen as superintendent at Charlestown. James W. Penney, Jr. becomes assistant superintendent of the company's Everett plant.

M. Frank Knoy comes from the research department of Eastern Gas & Fuel Associates to be the newly-appointed chief technical engineer for Boston Consolidated, and Warren E. Churchill, formerly chief chemist, will be assistant technical engineer.

Other promotions make Harold K. Emmons chief chemist and Arthur E. Garber assistant chief chemist. Bertwell M. Whitten, formerly designing engineer in the construction department, is promoted to technical assistant at the Everett plant.

Pierson and Sanders Advanced By Philadelphia Electric

W. C. Pierson has been made general superintendent of Philadelphia Electric Company's gas transmission and distribution department. He succeeds the late Paul Fusselman.

Mr. Pierson was employed by the utility in 1924, the year of his graduation from Pennsylvania State College as a chemical engineer. Prior to his new appointment, he was general superintendent of the building management department.

Samuel Sanders, Jr., has been named assistant general superintendent of the department. A graduate of the United States Naval Academy, Mr. Sanders was employed by Philadelphia Electric in 1924 as a cadet engineer in the gas distribution department.

Texas Gas Transmission Announces Organization Changes

Everett P. Russell has been named director of sales and customer relations for Texas Gas Transmission Corp. He has been active in architectural and engineering work involving plant site surveys, appraisals and management activities.

Texas Gas Transmission has also announced the appointment of Duncan K. Foulds and Monty G. Martin to staff the company's newly opened Shreveport office.

Mr. Foulds is a natural gas engineer, having worked previously for Transcontinental Pipe Line Corp. He is a graduate petroleum engineer from the University of Texas.

Mr. Martin, a geologist, was previously employed by the Carter Oil Co. He is a graduate of Oklahoma University.

Texas Gas' Shreveport office, the Company announced, will deal with all phases of gas supplies, including gas proration, engineering, estimating of old and new reserves, deliverability studies and contracting of new supplies.

James R. Lee Appointed GAMA Washington Representative

The Gas Appliance Manufacturers Association, with headquarters in New York City will expand the activities of its Washington office, effective January 1, according to H. Leigh Whitelaw, managing director.

James R. Lee

Leonard Macomber, GAMA Washington Representative since 1943, will retire on January 1, and James R. Lee has been appointed Washington Representative for the association with offices at 731 National Press Building, Washington, D. C.

For more than 20 years Mr. Lee has been identified with private and government public relations activities in Washington and in his home town of Memphis, Tenn.

During the war Mr. Lee was in charge of all Federal Public Housing public relations contacts with the Congress, the Army and Navy, other Federal and local Government agencies and White House liaison activities. He has served as a consultant for national associations.

Upon retirement, Mr. Macomber will serve as a manufacturers' consultant in Washington.

Northcutt and Moore Moved By Rockwell Mfg.

W. F. Rockwell, Jr., President of Rockwell Manufacturing Co., has announced the appointment of J. W. Northcutt as Atlanta district sales manager to succeed C. C. Moore who has been transferred to manage the company's new district office in Columbus.

J. W. Northcutt

Mr. Northcutt received a mechanical engineering degree from Oklahoma A & M College. In 1936 he joined the Tulsa office and became sales engineer for all company products in the Corpus Christi area. Prior to his present assignment Mr. Northcutt handled all major oil and engineering company accounts in the Houston district.

Mr. Moore, a graduate engineer of Washington and Lee University, became manager of meter parts for Pittsburgh Equitable Meter Co. in 1930. He had been Atlanta manager since 1943.

FPC Authorizes Pennsylvania Extensions; Draper Reiterates 'No Jurisdiction'

The Federal Power Commission has authorized the construction and operation of pipe line facilities in eastern Pennsylvania which will be used for the transportation and sale of natural gas by The Manufacturers Light and Heat Co. to the distribution companies serving the Harrisburg, Allentown, Bethlehem, Reading and Lancaster areas.

The authorization involves the delivery of natural gas by Texas Eastern Transmission Corp. to Manufacturers, which in turn will construct and install connections with pipe line systems of Allentown-Bethlehem Gas Co., The Harrisburg Gas Co., Consumers Gas Co., and Lancaster County Gas Co. The latter four companies are controlled by The United Gas Improvement Co. of Philadelphia.

Natural gas requirements of the four UGI companies for the maximum days in 1950 and 1954, respectively, are: Allentown, 1,850,000 and 4,400,000 cu. ft.; Harrisburg, 2,500,000 and 4,330,000 cu. ft.; Consumers, 1,800,000 and 2,600,000 cu. ft.; and Lancaster, 2,340,000 and 4,210,000 cu. ft.

The gas will be supplied from Manufacturers' system and from Texas Eastern, which latter company previously was ordered by the Commission to deliver a total of 7,500,000 cu. ft. daily to Allentown, Consumers and Harrisburg. One of the principal issues involved in the proceedings was the question of whether these companies would be better served (both as to rates and service) directly by Texas Eastern or through the medium of Manufacturers as a third party. In an opinion accompanying its order, the FPC found that each company will reflect savings in capital costs as well as gains in both gross and net income if natural gas service is available to the extent of full requirements from Manufacturers.

Each of the UGI companies had asked the Commission to find in effect that it was not subject to FPC jurisdiction. The FPC, however, found that the facilities to be constructed by Consumers, Harrisburg and Allentown will be used in the transportation of natural gas in interstate commerce, and in the sale for resale in interstate commerce of natural gas for ultimate public consumption subject to the jurisdiction of the Commission, and that the construction and operation of these facilities are subject to requirements of the Natural Gas Act. In the case of the Lancaster company, FPC found that by reason of the operation of the facilities which it will construct, it will be engaged in the transportation of natural gas in interstate commerce subject to Commission jurisdiction, and therefore is a "natural-gas company" within the meaning of the Natural Gas Act.

The Commission rejected the contention of the Allentown, Consumers and Harrisburg companies that the "catalytic cracking" process which they will use in their plants will result in an end product that is not "natural gas" under the Natural Gas Act.

The FPC found that "this mixture of straight natural gas with the catalytically produced gas is unquestionably 'natural gas' within the definition of the term as used in the Natural Gas Act."

Lancaster plans to distribute straight natural gas in four of its divisions and mixed gas in the Lancaster city division. The three other UGI companies will distribute mixed gas.

Commissioner Draper Dissents

Commissioner Claude L. Draper filed a separate statement concurring in the Commission's action in authorizing the Texas Eastern, Allentown-Bethlehem and Manufacturers facilities, but dissenting from the conclusions reached in the cases involving the Lancaster, Harrisburg and Consumers companies.

Stating that each of these three latter companies is engaged solely in the local distribution of gas, Commissioner Draper said that "the operations of the three companies as to which I am dissenting are subject to and are fully and completely regulated by the Pennsylvania Commission. Such activities are very clearly and definitely exempted from our jurisdiction by the Natural Gas Act. . . ."

ASHVE Will Meet in Dallas January 22-26

The American Society of Heating and Ventilating Engineers will hold its 56th annual meeting in Dallas from January 22 to 26. An attendance of about 2000 "engineers of human comfort" is expected. Subjects to be covered at the five technical sessions include the use of night air for cooling, heat pump performance, panel heating and cooling, condensation on walls, effective temperature studies and baseboard radiation performance. Headquarters will be the Hotel Adolphus and the Baker Hotel.

The Southwest Air Conditioning Exposition, which will be held simultaneously with the ASHVE meeting, will be housed in the Hall of Agriculture and the Poultry Building at Fair Park.

Argentine Technician Now in U. S.

Felix F. Blanco is now in the United States representing the Argentine government, which on Dec. 15 completed a 1,100 mile natural gas pipe line.

Mr. Blanco plans to study all aspects of the operation and maintenance of long distance pipe lines.

Rocky Mountain Ass'n Holds Annual Meeting

1950 Officers
Front row, left to right: Dick Tanner, S. J. Neely, D. A. Bell. Back row, left to right: Roy G. Munroe, Paul W. Young, Ben C. Heald.

S. J. Neely was elected President of the Rocky Mountain Gas Association at its annual meeting on December 12. Mr. Neely represents the branch of the association known as retail stores. He is manager of the North Denver Furniture Co. and past President of the Rocky Mountain Retail Furniture Dealers' Association. The other six branches of this organization are the Architects & Engineers, Gas Equipment Manufacturers, Plumbers, Heating Contractors, Wholesalers, and Utility Companies.

Other officers elected—one from each branch—were Dick Tanner, Security Heating Co., vice-president; D. A. Bell, Bell Plumbing & Heating Co., vice-president; Roy G. Munroe, Public Service Co. of Colorado, secretary-treasurer. G. M. Musick, architect, Ben C. Heald, A. O. Smith Corp. and Paul W. Young, C. A. Crosta, Inc., were elected directors.

The Rocky Mountain Gas Association is primarily interested in solving the various problems which bother users of natural gas in the high altitudes of the Rocky Mountain area. Those in the various branches of the gas industry in the only portion of the country where city gas is supplied at more than 4,000 feet above sea level, found it necessary some years ago to band together to bring about more consideration on the part of gas equipment manufacturers, wholesalers, installers and dealers of the very serious difficulties encountered in trying to make gas equipment operate satisfactorily in the rarefied atmosphere of the Rocky Mountain area. Much progress has been made in devising testing methods and in designing gas appliances to render rated performance to customers when used in high altitudes.

J. E. Dowen Gets New Duties At Peoples Gas Light & Coke

Jesse E. Dowen, superintendent of the meter reading department, The Peoples Gas Light and Coke Co., Chicago, has been appointed assistant to the vice-president in charge of customers service.

Stuart M. Phelps To Receive High Ceramic Award

At the meeting of the Pittsburgh Section of the American Ceramic Society held on December 13, it was announced that Stuart M. Phelps, senior fellow, Mellon Institute, and director of research and tests, American Refractories Institute, has been chosen as the recipient of the 1950 Albert Victor Bleininger Award, considered the highest honor conferred in this country for "distinguished achievement in the field of ceramics."

The award, which consists of a medal and scroll, will be presented to Mr. Phelps at a dinner to be given in his honor at the Hotel Schenley on March 10.

Throughout his professional career, Mr. Phelps has been associated with Mellon Institute to which he came in 1917 as a laboratory assistant. In 1918 he was appointed to the Refractories Fellowship, becoming senior fellow in 1926. Since that time he has been in charge of the fellowship's program of research and testing. Mr. Phelps has made many valuable contributions to the technology of refractories. He has become one of the best known and most widely recognized authorities in his field.

Reliable Is the Word for This

The 1897 model Reliable range which won her a 1949 Wedgewood range receives a last fond look from Mrs. R. B. McClung, of Portland, Ore., who made the oldest trade-in during the Oregon Gas Appliance Society-sponsored "Old Stove Round-Up."

Congratulating her is Beatrice Barclay, Society executive secretary.

Other top prizes were ranges on which the newest trade-in was made—a two-year-old electric—and the one nearest the campaign average trade-in—a gas range 21 years and four months old.

El Paso Natural Proposes Changes in Line

El Paso Natural Gas Co. has filed an application with the Federal Power Commission proposing changes in three previously authorized pipe line projects in Texas, New Mexico, and Arizona designed to carry natural gas for delivery to three utility companies in California.

The facilities as previously authorized are to deliver 405,000,000 cu. ft. of gas per day to Southern California Gas Co. and Southern Gas Co. of California, and 250,000,000 cu. ft. daily to Pacific Gas and Electric Co.

The proposed changes, El Paso said, would make these facilities better adapted for the transportation of the quantities of natural gas previously authorized, and are necessary to obtain the previously authorized quantities of gas from sources of supply in Texas and New Mexico.

The additional facilities which the company proposes to construct are estimated to cost $16,622,712. However, El Paso said that it would save an estimated $9,338,972 on the facilities which would not be built under the new plan. This would make a net increase of $7,283,740 in the total cost of the three projects, which were previously estimated to cost $162,256,032.

The proposed changes involve approximately 501 miles of pipe line, some of which would be new line not included in the previous plans and other which would be substituted for certain sections of the lines as previously authorized. The proposal also includes changes in compressor stations, purification, dehydration and absorption plants, and in field and branch lines.

Servel Forms New Department Under Paul Kennedy

Paul Kennedy has been named director of retail sales development for Servel Inc., Evansville, Ind. Mr. Kennedy has been handling Servel's training and selection program as a part of the company's advertising and sales promotion department.

This new department will be responsible for the development of creative retail sales methods, procedures for hiring and training of retail salesmen and development of sales training programs.

Previous to his association with Servel, Mr. Kennedy was supervisor of sales promotion for the Equitable Gas Co., Pittsburgh.

Three other men in the Servel sales organization have been transferred to the retail sales development. They are Byron A. Bliven, Leonard Hadley and D. P. Finney.

C. L. Jamesson Joins Caloric

Caloric Stove Corp., Philadelphia, has announced the appointment of Charlton L. Jamesson as district sales representative for the Pittsburgh area.

Stacey-Dresser Is Moving to Cincinnati

Stacey-Dresser Engineering Division, Cleveland, Ohio, is in the process of moving its headquarters to Cincinnati, according to an announcement by H. N. Mallon, President of Dresser Industries, Inc.

E. A. Flaschar, general manager of Stacey-Dresser, will direct the coordination of the activities of his organization with those of its parent company, Stacey Bros. Gas Construction Co., a subsidiary of Dresser Industries.

The address of Stacey-Dresser Engineering Division becomes the same as that of Stacey Bros.: P. O. Box E (5535 Vine St.), Cincinnati 16.

Charles L. Ferry Retires From Southern Counties

Charles L. Ferry, since 1923 industrial engineer for the Southern Counties Gas Co., Los Angeles, retired December 1 under the company's uniform pension and benefit plan.

During the past 26 years under Ferry's guidance, the industrial use of gas in the Southern Counties' territory developed from a relatively minor aspect of the business to one of great importance.

Large Natural Gas Discovery In Peace River, B. C.

Natural gas has been discovered in large quantities in the Peace River area of British Columbia. Pacific Petroleum Ltd., Peace River Natural Gas Co. and Royalite Oil Co. are sponsoring exploration work in the B. C. section of the Peace River Block. Now No. 8 well of Pacific Petroleum located 20 miles southeast of Fort St. John, and approximately 25 miles northwest of Dawson Creek, is flowing 416,000 cu. ft. of gas daily.

Pacific Pete is drilling Peace River acreage in hopes of proving sufficient gas supply for a pipe line to Vancouver. The company is headed by Frank McMahon, Calgary, who also is President of West Coast Transmission, the only company incorporated to date for a projected pipe line to the coast.

Pacific, through its subsidiary, Peace River Natural Gas Co., holds 1,200,000 acres in northeast B. C. where No. 8 came in at a depth of approximately 5100 ft.

Pioneer independent, Pacific Pete recently extended operations to cover likely gas and oil areas in the three western provinces.

Of particular interest to the Pacific Coast is addition of 26,000 acres in the Gulf Islands where oil and gas rights were obtained from Canadian Collieries through efforts of Norman Whittall, Vancouver, director of both companies.

The company plans Gulf exploration in partnership with Royalite Oil Co., another leading independent, which holds a B. C. government reservation on 250,000 acres on Graham Island in the Queen Charlotte and is moving in equipment to the first site near the Indian village of Skidegate.

Following up the recent Imperial Oil discovery 30 miles south of Peace River town, Pacific extended its far northwest holdings by 1,360,000 acres, bringing its total acreage in Alberta to 6,500,000 acres.

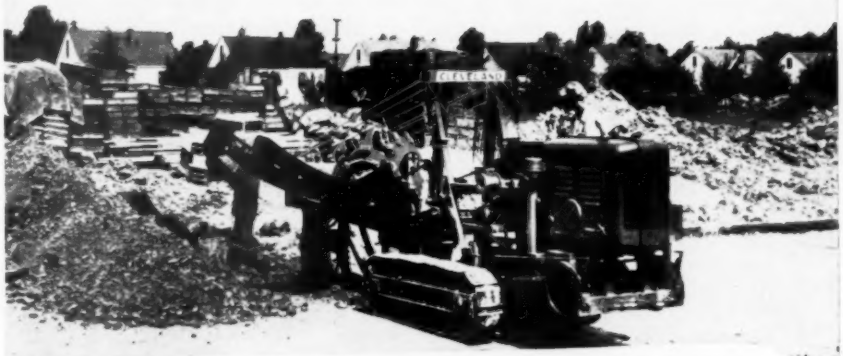
This spread forms a block 70 miles long and 10 to 70 miles wide, extending from Peace River south to Fort Vermillion with the south end about 300 miles northwest of Edmonton. Another block of 38,400 acres is 23 miles south of Imperial Normandville discovery well.

Other interests of Pacific include 25 per cent of the capital of Bear Oil Co., holder of nearly 5,000,000 acres in northern Alberta and 700,000 freehold acres in Saskatchewan.

The company draws production from 17 wells wholly or partially owned in Turner Valley and 17 wells in Redwater field.

THE CLEVELAND BABY DIGGER

Teamed with the T-5 TRAILER



GIVES YOU THE TWO TRENCHING ESSENTIALS—
FULL-CRAWLER ON-THE-JOB MANEUVERABILITY
and FAST, SAFE JOB-TO-JOB MOBILITY

Small, compact, sturdy and fast, the New Model "92" delivers the ultimate in performance on your city and suburban gas trenching jobs. Digging to a full 5' depth and a width of 10" to 20", it is ideal for house services or main line work within its capacities. Smooth clog-proof anti-friction-bearing-mounted full crawlers give you hairline maneuverability on the job. Safe, quick loading and unloading on its low-bed tilt-body rubber-tired T-5 Trailer give fast truck speed job-to-job mobility. See your local CLEVELAND distributor for specifications.

THE CLEVELAND TRENCHER CO. 20100 ST. CLAIR AVENUE CLEVELAND 17, OHIO

Year End Review

(Continued from page 23)

tiated in 1949, and the General Promotion Planning Committee and the National Advertising Committee were presented with organized selling and merchandising programs for 1949 and 1950.

Home service departments of gas utility companies in the United States and Canada last year employed 1,200 women in making nearly 9,000,000 customer contacts. Home service calls were made on about 376,000 new customers and home service representatives gave more than 6,500 demonstrations with about 350,000 attending company auditorium demonstrations and 590,000 in attendance at outside demonstrations.

Industrial and commercial utilization of gas continued to advance during 1949. While the increase in revenues from sales of all gas for the year was 7.3 per cent over 1948, industrial gas revenues were up 8.3 per cent and commercial gas revenues rose 7.9 per cent over 1948. The combined industrial and commercial revenues now account for 38 per cent of the total revenues of the industry.

The industry has met an increased competitive assault on its commercial cooking business. Published results of tests of comparative costs made by the Association's committees have enabled gas utilities to hold and increase their dominance in the commercial cooking field.

New techniques in industrial and commercial applications have maintained technical advantages of fuel gas. Many new developments were perfected during the year, among them being a new type of large volume water heater built so the water supply is directly tied in with commercial dishwashers. In the industrial field a new application of carbo-nitriding in surface hardening of metals maintains carbon pressure and heat contained in a furnace over a weekend with no change in the properties of the metal being treated.

The Association completed its fifth year of operation under its coordinated Promotion, Advertising and Research (PAR) Plan on September 30. Nearly 7¾ million dollars, voluntarily contributed by member companies, have been devoted to the improvement of gas and gas services during the five-year period.

More than fifty projects embracing research work in gas production and utilization, mixed and other gases, in domestic and general technical gas research fields were prosecuted under the Association's coordinated research program last year. Research work necessarily is long range work and often it is difficult to establish the demarkation of progress for a given year. But the many tangible benefits already derived from this research program have more than repaid many of the subscribing companies for their share of the $2,500,000 contributed to these research activities.

The outstanding development of the year in advertising was the complete coordination of advertising themes by the Association, the appliance manufacturers, gas utility companies and dealers, resulting in substantially higher return on the dollar invested and a rising volume of appliance sales during the latter part of the year.

Newspapers were again at the head of the list carrying advertising totaling $3,200,000 devoted to the promotion of automatic gas ranges, automatic gas water heaters and the gas refrigerator. Additional local campaigns were conducted in behalf of the all-year gas air conditioner, the gas incinerator and the automatic gas laundry dryer.

The largest single promotion was on the automatic gas range. The Association spearheaded this drive with an appropriation of $550,000 for national consumer magazine advertising, and the manufacturers spent in excess of $1,000,000 using the same theme as the Association's advertising. A second campaign was initiated in behalf of automatic gas water heaters and a third drive promoted the gas refrigerator. Total magazine expenditures for all gas appliances by the Association and the manufacturers were $2,000,000.

The Association carried on for the twenty-sixth year its industrial and commercial advertising in business and technical magazines.

Domestic gas ranges were the chief promotional item featured in 1949. Early in the year about 200 gas utility companies coordinated in a drive utilizing a promotional portfolio produced by the promotion bureau. A survey of public attitudes toward water heating had been made earlier and the answers to many fundamental questions concerning customer preferences were set forth in a booklet for gas utilities. Points of superiority of the gas water heater were established and used in national advertising.

The Association cooperated with Encyclopedia Britannica in the production of a moving picture film entitled "Gas In Home and Industry," for educational use. Through showings of this film the story of our industry will be brought to millions of school children. The Association's Hollywood representative has been successful in placing gas appliances in more than 200 moving picture films, shorts and educational features during the year.

A fall promotion campaign "The Old Stove Round Up" designed to replace obsolete cooking appliances with mod-

STAMANCO
GAS PURIFIERS

STAMANCO Purifier Boxes are designed to your specific operating and service conditions -- thus assuring utmost efficiency and economy. Made in any style or capacity. We design, build, and install STAMANCO Purifier Boxes complete with all trays, piping, valves, gantry cranes, and equipment for the economical handling of oxide materials. Let us figure on your requirements.

The STACEY MANUFACTURING Co.
SINCE 1851
CINCINNATI 16, OHIO
GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES
ENGINEERS • FABRICATORS • CONSTRUCTORS
An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

ern gas ranges proved to be one of the most successful campaigns ever undertaken. It is estimated that more than one million gas ranges were sold as a result of this coordinated drive by gas utilities, appliance manufacturers, and dealers spearheaded by AGA. In October 1949, sales of gas ranges rose to 260,000 units, an all-time monthly record. Shortages of steel as a result of strikes possibly prevented further new records in November and December.

A major continuing activity of the Bureau of Statistics was the publication of Gas Facts, the industry's statistical year book, which was issued with new charts and material. The Bureau resurveyed capital requirements of the gas industry and also completed a survey of gas house heating which presented an optimistic outlook for 1950. In cooperation with Edison Electric Institute the Association's Committee on Economics produced a study "Financing Utility Capital Requirements" highlighting the magnitude of the utilities' post war construction program and offering suggestions as to how individual utilities might facilitate financing programs.

The Operating Section continues to be responsible for the production and distribution of gas and its by-products. At two conferences during the year more than 1,500 members participated in discussions of chemistry, motor vehicle, production and distribution advances and problems.

The Spring Accounting Conference in Detroit, in which the Association and the Edison Electric Institute jointly participated was the largest accounting conference staged by the combined associations. The section cooperated with the Statistical Bureau and with the Committee on Economics of AGA in resurveying the construction program of the gas utility industry for the five year period 1948-1952.

Two Stage Changeover

(Continued from page 33)

for natural gas. This means that after the appliance has been converted, the intermediate gas flame should be set as sharp as possible without lifting so when natural is turned on the correct primary-air ratio will be obtained.

In converting from propane-air to natural the same procedure can be followed as above using mixtures of propane-air and natural gas.

In all of the above it is assumed that all burners will be correctly drilled to the proper port area which is about 19,000 to 23,000 Btu per square inch of port area.

Converting by use of an intermediate gas is the least expensive, and if it can be accomplished it is the one to be preferred.

Other methods of converting are by sectionalizing an area and converting over a period of from one day to one week. This method is usually expensive and its procedure is one of timing and notifying the customers of what to do before conversion men arrive. Orifice charts, mechanical procedure, and port drilling are the same as for any other type of conversion.

The pressure method of changeover is difficult to use because of the difficulty in controlling primary-air settings. It is very possible, however, to combine a slight pressure change of about one-inch with some intermediate gas. This combination is well worth investigating.

In conclusion, anyone contemplating a changeover should study their present and future gas as much as possible. In the last ten years the AGA has conducted many research programs and they are published in various bulletins. Bulletin No. 10 is especially helpful. Assign a technically trained man in your organization to study your gases from these bulletins. If you do not have such a man in your organization, then it will pay you to hire a consultant who is familiar with these bulletins and can study your problem.

The above is the only way I know of to convert at the least cost and keep your customers' goodwill.

Manufacturers Expect

(Continued from page 23)

000 gas ranges during the second half of 1949 and thereby replacing as many as possible of the two out of three gas ranges in use which are more than 10 years old, gas range manufacturers of GAMA, in conjunction with the AGA, gas utilities and dealers, launched a nation-wide "Old Stove Round Up" for the last six months of the year. Quotas set by individual dealers and gas utilities were exceeded by as much as 60 per cent and retail salesmen dressed as cowboys scoured the country to locate the oldest ranges in use. Many ranges which have been in constant use for more than 30 years were replaced by new, automatic models. The "Old Stove Round Up" was one of the most successful promotions in the history of the gas appliance industry.

So successful was this "Old Stove Round Up" that it will become an annual fall feature for the 400 gas utilities, 62 manufacturers and 65,000 dealers who promote the sale of gas ranges.

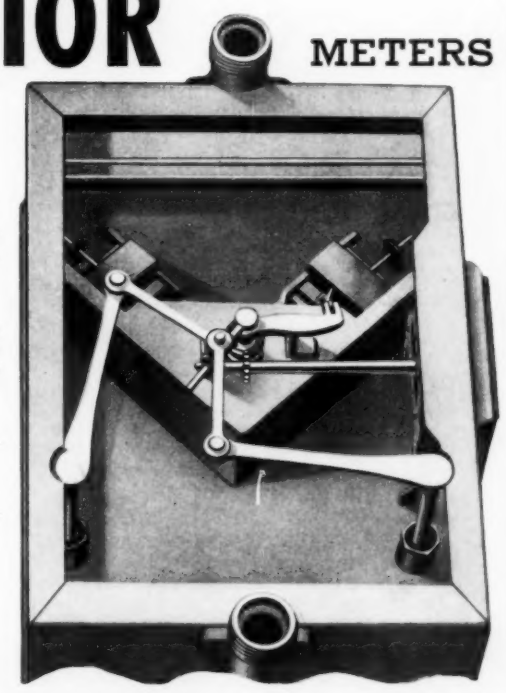
Gas ranges will be actively promoted every month during 1950 with special intensified campaigns planned for the spring and fall of 1950, backed by $1,750,000 in gas range manufacturers' and AGA national advertising.

Gas refrigerators continue to outsell

SUPERIOR METERS

ALL THAT THE NAME IMPLIES

- FULL LINE
  From 150 to 7,500 cu. ft. per hour capacity. For domestic, commercial & industrial use.
- TIME TESTED QUALITY
  One-piece, ribbed steel carriage. Heavy, non-fluttering valves. Flanged cases. Many other proved features.
- FAST PARTS SERVICE
  Interchangeable parts for "Superior" and other makes.
- NATIONALLY RECOGNIZED
  Increasingly specified by America's leading gas utilities.



Specialists in Tin Steel Gas Meters

CATALOG ON REQUEST

SUPERIOR METER CO., INC.

Meters • Meter Repairs • Diaphragms • Parts • Accessories

167 41ST STREET, BROOKLYN 32, N. Y.

other brands of refrigerators in many parts of the country. New models, to be introduced in January, will be backed by the largest national advertising and promotional program in the history of the industry. These expanded programs are expected to enable the gas refrigerator to strengthen its position in the intensely competitive household refrigeration field.

The LP gas industry continues to provide a rapidly growing and attractive market for gas appliance and equipment manufacturers. With approximately 5,500,000 residential customers, representing a growth of 600 per cent in the past ten years, LP gas users in 1949 purchased 24 per cent of all gas ranges produced; 12 per cent of all automatic gas water heaters manufactured, and similar high percentages of other gas appliances. The LP gas industry provides cooking service for more rural and "beyond the main" homes than any other automatic fuel.

The 1950 proposed $750,000 LP gas industry promotion and advertising campaign is expected to increase rapidly the number of homes using LP gas and to increase the importance of this relatively new gas appliance and equipment market.

Hotel and restaurant equipment manufacturers, in cooperation with dealers, distributors and gas utilities, are planning coordinated promotions to help maintain and expand their sales position.

GAMA is planning the largest exhibit of appliances and equipment in the history of the industry in October at Atlantic City to acquaint gas appliance dealers, distributors and gas utility sales personnel and LP dealers with the newest features of the latest appliances and equipment. This exhibit is held every other year in connection with the AGA annual convention.

With no part of the country beyond the economic reach of low cost natural gas from Texas and other fields, the extension of natural gas pipe lines and the expansion of gas manufacturing facilities already under construction will open vast new markets for gas appliance and equipment manufacturers. The approximately 20,000 miles of natural gas pipe line planned for the next three years will bring natural gas to the Atlantic seaboard, the Pacific northwest, and provide adequate supplies of natural gas to both established natural gas areas and additional communities.

To capitalize on these vast undeveloped natural gas and LP gas markets, and to meet the intense competition contemplated in the future, manufacturers are planning coordinated promotions so that all factors of the industry may benefit and so that each manufacturer's individual promotions will be strengthened. Recognizing the aggressive plans being made by competitive industries, appliance and equipment manufacturers are contemplating more closely coordinated industry-wide programs in which all manufacturers, dealers and gas utilities can cooperate and benefit.

Enter Gas Conversion Field

Gas Construction and Service Co., 217 Broadway is a newly organized firm set up to handle complete conversion operations for gas utilities, transforming their systems from a manufactured to a mixed or natural gas sendout.

The company announces that in addition to customer conversions, its engineering staff is prepared to remodel water gas plants, adapting them to a changed Btu, and to give consulting service on any operating problems encountered.

Associated in the venture are: Harold Moore, formerly of Semet-Solvay Engineering Corp.; C. B. Farrell, one-time utility operating engineer who has most recently been engaged in conversion work as an independent operator; and Walker W. Stevenson, for 15 years a consulting engineer to the gas and by-products coke industry.

Rating
CAPACITY
Listed capacity ratings for gas regulators, granted by A.G.A., are determined by measuring the volume of gas which will pass through the regulator without exceeding a specified energy loss, or "pressure drop", when operating with other components of the gas unit manifold.
Selection of a gas regulator, therefore, must be made on the basis of its performance in conjunction with these other components rather than by its listed capacity rating!
MAXITROL Gas Regulators provide greater flexibility in selecting YOUR most efficient and economical regulator.
DETROIT GAS REGULATOR CO.
Maxitrol
1742 RIVARD • DETROIT 7, MICH.

CONVENTION CALENDAR

January

23-27 *Southwest Air Conditioning Exposition*, State Fair Grounds, Dallas, Texas
23-27 *American Society of Heating and Ventilating Engineers*, Annual Meeting, Dallas, Texas
30-31 *Joint AGA-EEI Planning Meeting*, Netherland Plaza Hotel, Cincinnati, Ohio

March

23-24 *New England Gas Association*, Hotel Statler, Boston, Mass.
27-29 *Southern Gas Association*, Galveston, Texas
31 *The Maryland Utilities Association*, Lord Baltimore, Baltimore, Md.

April

10-12 *Mid-West Gas Association*, Hotel Lowry, St. Paul, Minn.
12-14 *National Petroleum Association*, Hotel Cleveland, Cleveland, Ohio
20-22 *Florida-Georgia Gas Association*, Business Conference, Biltmore Hotel, Palm Beach, Fla.
28-29 *Indiana Gas Association*, French Lick Springs Hotel, French Lick, Ind.

May

1-4 *Chamber of Commerce Annual Meeting*, Wash., D. C.
8-9 *A.G.A. Natural Gas Department*, Spring Meeting, Mayo Hotel, Tulsa, Okla.

Are you getting your own copy of American Gas Journal?

Do you get the current issue when it is right off the press, when the news is new? Or are you somewhere along the middle in a Routing Slip routine, that brings you the Journal after it has been noted and passed on by half a dozen previous readers? And the American Gas Handbook. Is it on your desk, or in your own office, handy for instant reference with its wealth of charts and tables that in daily use replace half a dozen reference volumes? While the new edition of the Handbook lasts, a copy is sent free to every new subscriber to American Gas Journal. $3 a year for both. Use the coupon below, and you will get **your own** copy of American Gas Journal for all of 1950, and the Handbook will be yours for keeps.

AMERICAN GAS JOURNAL
205 EAST 42nd ST., NEW YORK 17, N. Y.

☐ Enter my subscription for one year

☐ Check for $3.00 is enclosed

☐ Please bill me

NAME POSITION

COMPANY

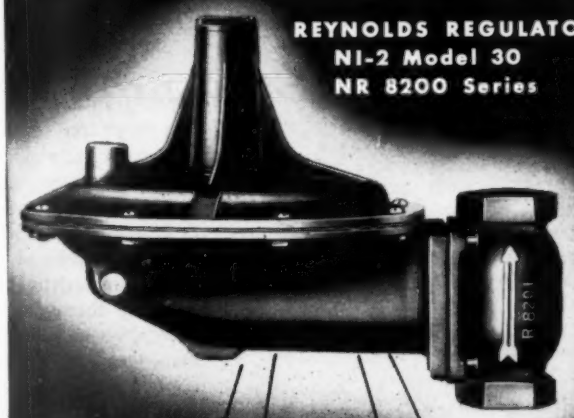
STREET

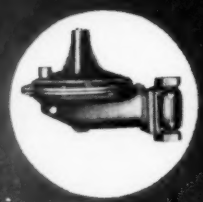
CITY ZONE STATE

4 INSTALLATION POSITIONS

...for easy connections
Spring Top operates pointing either up or down

REYNOLDS REGULATOR
NI-2 Model 30
NR 8200 Series





Vertical Position with down flow

Vertical Position with up flow

Inverted Position for use where accumulation of water is problem

Horizontal Position with flow left to right or by changing setting 180° with flow right to left

1. This regulator is available with any type seal previously made by Reynolds.
2. Quickly installed in existing house piping.
3. May be installed in any position on a 90° setting.
4. Orifice can be changed at any time.
5. To inspect orifice or valve pocket, only an Allen wrench is needed.

Reynolds

GAS REGULATOR CO.
ANDERSON · INDIANA · U. S. A.

New Line of Hancock Valves

A new line of 150 lb. Hancock bronze valves with stainless steel seats and discs and a diaphragm construction claimed to be 125 to 230 per cent stronger than found in usual bronze valves of similar type has been announced.

The new valves are being manufactured in sizes of one-quarter through two inches.

Hancock valves, manufactured in Watertown, Mass., are a product of Manning, Maxwell and Moore, Inc.

Continuous Gas Generator

(Continued from page 11)

control of the temperature by zones along the cracking tube. In addition, steam and air, and conceivably carbon dioxide, in any desired proportion are added. As is readily apparent, the greater the addition of steam, the greater the production of hydrogen and consequent lowering of the specific gravity. With the reduction or elimination of steam and the use of air, higher specific gravities can be obtained. With the flexibility of control provided and the high temperature range of the equipment it is easy to start with any raw material and through adjustment on the basis of heating value, specific gravity, and gas analyses arrive at any desired make gas chemically possible. By subsequent blending of the feed gas and the make gas, or other gas, further variations in end product are possible.

When liquid charging stock is used, the preheated liquid is pumped at high pressure through nozzles at the top of the carborundum tubes. All feed gases including steam and air are admitted concentrically about the liquid nozzles. The resulting make gas is then passed through the condenser.

Subsequent operations may involve only metering but with heavy liquid feeds the use of a small tar and liquor separator and tar extractor may be advisable.

Table 2 shows actual gas analyses resulting from operation of this equipment. Attention is called to the range of end products for each of the raw materials processed. For example: in the case of starting with natural gas, heating value varies from 287 to 535 with specific gravity ranging from 0.34 to 0.60. Note particularly that variations in heating values are possible while maintaining the same specific gravity and also that variations in specific gravity are possible while retaining the same heating value.

FPC Issues Natural Gas Statistical Book

The Federal Power Commission has announced that the 1948 edition of its annual publication, "Statistics of Natural Gas Companies," is now aavilable. Copies are $2.00 each.

Industrial and Commercial Sales Conference

The 1950 AGA sales conference on industrial and commercial gas will be held at St. Louis on April 4, 5 and 6 at the Hotel Chase.

"The Gem of Them All"
COLUMBIA CONVERSION GAS BURNERS
More Popular Than Ever
With Home Owners and Dealers

DEALERS SAY—Columbia Nutipe Burner has a common sense design. Closely duplicates operation of appliance when solid fuel was used. Easy to install. Seldom requires service.

HOME OWNERS SAY—Gives quick heat transfer and earlier delivery of heat to rooms. Has tamper-proof controls and quiet operation.

MODEL P-ZE
shown here is designed for use in warm air furnaces or round type boiler where grates are removed.

Send for free folder giving complete instructions for installing

THE COLUMBIA BURNER CO.
729 Ewing Street · Toledo 7, Ohio

NORWALK
DISC TYPE CHECK VALVE
Flanged and
Fabricated in steel
For GAS and AIR
LOW and HIGH PRESSURES

Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE COMPANY
South Norwalk, Conn.

GE Looks for Increase In Air Conditioning

A 25 per cent increase in the sales of air conditioning and automatic heating equipment can be achieved in 1950 by aggressive merchandising plans, Harold F. Smiddy, vice-president of the General Electric Co. and general manager of its air conditioning department, stated at a meeting of the department's distributors in New York on Dec. 12.

The meeting was attended by more than 350 distributors of the company's automatic heating, air conditioning and commercial refrigeration equipment.

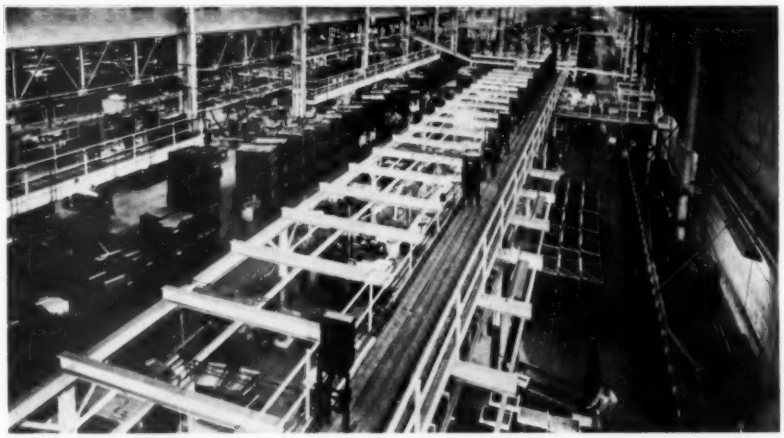
"Public acceptance of air conditioning products reached a new high during the past year," Mr. Smiddy said, "yet less than 10 per cent of the potential market has been sold. The time has now come when good, aggressive selling can increase industry sales by at least 25 per cent in the coming year."

Mr. Smiddy based his statement on four factors—improved products, greater public acceptance, plans for a better selling job, and revived promotion of air conditioning equipment by utility operating companies in many parts of the nation.

Mr. Smiddy said that General Electric had pioneered the development of complete packaged heating systems for the home with its new Air-Wall heating unit introduced early in 1949.

In his report, Mr. Smiddy announced that General Electric's position in the air conditioning and automatic heating industry will be enhanced by a four-point program covering the development of packaged equipment and merchandise, more simplified product lines and models, plans for promoting year-around markets, and the largest national advertising program directed at users of air conditioning products ever undertaken by the company.

New Appliance Plant Operates on Mass Production Basis



The Murray Corporation of America, one of the nations largest producers of automobile bodies, has recently entered the home appliance field on a mass production basis in a large converted aircraft plant at Scranton, Pa. Shown above is one of the assembly lines in a building ¼ mile long which houses 2½ miles of conveyors, transporting sub assemblies and finished appliances through successive stages of the manufacturing operation. The output will include all welded gas and electric ranges, in addition to sinks, kitchen cabinets, bathtubs and lavatories.

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GAS HOLDERS PURIFIERS

Recent Labor Activities

(Continued from page 15)

ance work by grievance committee members cannot be considered as absence from work when figuring vacation entitlement. Grievance work is considered to be equal in importance to normal production work.

The NLRB ruled that where two rival unions claim to represent the employees of a company, the employer is within his rights to refuse to bargain collectively with either of them.

A New Jersey Supreme Court ruled that where an arbitration award had been rendered pursuant to a compulsory arbitration statute, which had been declared unconstitutional, the court would not grant a review of the arbitrator's decision.

The New York Supreme Court found that a union does not have the right to picket an employer whose employees are not on strike by falsifying the facts through misleading signs or placards.

The National Labor Relations Board reports that:

In an election held among the regular employees of the Oklahoma Gas & Electric Co. in the outside transmission and distribution departments and in the general repair shop that 130 votes were cast for the petitioner, the International Brotherhood of Electrical Workers, AFL, and 465 votes against for certification of that union.

The Gas Workers Union, AFL was certified as the bargaining agent for the employees of the distribution department, customer's service dispatcher, senior clerk operating, clerk B operating, production department, station clerk, weighmaster, coal clerk and shipping clerk of The Peoples Gas Light and Coke Co., Chicago.

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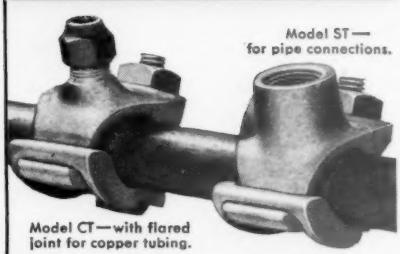

Model ST—for pipe connections.

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Legal Decisions Clarify

(Continued from page 35)

who exercises an independent employment and contracts to do certain work according to his own judgment and method, without being subject to his employer except as the results of his work."

This court explained that if the employee was not required by the company to report for work at any certain time, and could quit when he wanted to do so, and had furnished his own truck, he would have been an independent contractor.

Transportation of Employees

Generally speaking, a gas company is liable in damages for injuries to employees being transported to and from their work in a company vehicle. Also, the driver who operates his own automobile in transporting company's employees is liable for negligence if he charges passengers.

See Morse v. Walker, 51 S. E. (2d) 496, reported March, 1949. Here a passenger voluntarily offered to pay for the gasoline and oil on a trip. An accident occurred and the passenger was injured. He sued the automobile owner for damages. The higher court held in favor of the passenger, saying:

"The motorist who transports for pay is accountable, while he who transports his 'guest without payment for such transportation' is liable only for injuries caused by his gross negligence or wilful or wanton misconduct."

Hence, if a gas company's employee furnishes his own automobile for transportation of passengers, or company's employees, the owner of the automobile is solely liable in damages for injuries to the passengers, providing of course such transportation is *not* for exclusive benefit of the gas company. The higher courts have held that transportation of employees to and from the gas company's plant, or other works, is not for the benefit of the gas company. Hence, the gas company is not liable for injuries to such passengers.

Driver Is Personally Liable

Modern higher courts consistently hold that when a gas company is liable for negligent injuries caused by a driver of a motor vehicle, the driver also is personally liable to the injured person.

If paid vehicle drivers are informed of their personal responsibilities for injuries caused by negligent driving, there is no question but that the knowledge thus imparted will induce them to use a higher degree of care to prevent accidents.

For example, in a leading case (218 N. Y. S. 536) the testimony proved that a paid driver negligently drove the vehicle in contact with a pedestrian who, being seriously injured, sued the

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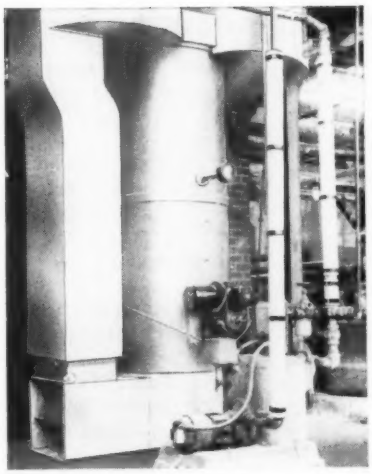
driver for damages. This court held that any driver is liable in damages, even though he may not be the owner of the automobile, if he operates it in a careless manner and effects an injury.

Also, in another case (217 N. Y. S. 261), a hired driver of a motor vehicle negligently collided with an automobile seriously injuring its occupants. This driver was held liable in a large sum of money for the injuries he effected.

It is advisable to include in employees' contracts of employment, the following:

"To drivers of company: In order to minimize your own personal liability, as well as your employer's, for injuries caused by operation of motor vehicles, new and outstanding higher court decisions teach that you can reduce chances of law suits by abiding by rules, as follows:

(1) Always be careful; (2) slow moving vehicles keep to extreme right side of street; (3) don't pass another vehicle at a curve; (4) don't speed for intersections or lights; (5) don't park disabled vehicle on highway; (6) don't use glare or blinding headlights; (7) always keep vehicle under control; (8) if a child appears near curb, slow down; (9) if foggy or slippery be ready to make emergency stop; (10) don't speed up when another vehicle attempts to pass you; (11) keep in proper driving lanes; (12) don't permit your lights and brakes to get defective; (13) always look before backing up; (14) use care when passing through signal lights; (15) signal and look both before making a turn; (16) discard worn tires; (17) don't pick up strangers; (18) move to extreme right when driver in rear blows his horn; (19) don't zig-zag when passing another car; (20) pull to curb when fire department or other emergency vehicle approaches; (21) always park close to curb; (22) be careful, although another driver is violating a traffic regulation."



New Heat Unit For Process Work

For drying lacquers, finishes, or any material requiring temperatures up to 500°F, a new model of Thermobloc self-contained direct fired industrial heating units has been announced by Prat-Daniel Corp., East Port Chester, Conn.

Primary unit is a gas or oil fired heater of 300,000 or 550,000 Btu's per hour, employing forced air circulation. The new model is designed to re-circulate its air until the desired temperature is reached. The unit then discharges continuously at the temperature required.

Beaver Improves Line

Two new features have been incorporated into the design of Beaver pipe tools heavy-duty Model-A and Model-B pipe and bolt machines.

An automatic safety switch lock has been added to protect both workmen and machines from damage caused by accidental startings. This device makes starting impossible unless the chuck wrench is in its holder.

Also added to absorb "whip" from long lengths of rotating pipe is an eccentric spool pipe rest.

For information, write for Catalog 50, Beaver Pipe Tools, Inc., Dana Ave., Warren, Ohio.

Coleman Offers New Furnace

A new gas-fired forced air furnace for use with its "blend-air system" of home heating has been announced by The Coleman Co., Inc., Wichita, Kansas.

Designated the Model 82B, the new furnace has an input rating of 95,000 Btu per hour and an output of 76,000 Btu per hour. Air delivery rate when used with a conventional duct system is 930 cu. ft. per minute at .25 inches water gauge. When used with Coleman "blend-air," the blower is adjusted to deliver 615 cu. ft. per minute through the furnace with an equal volume recirculated by blending for a total circulation of more than 1,200 cfm's.

Overall dimensions are: heighth, 62¾"; depth, 30"; width, 24". The furnace has been approved by AGA and complies with commercial standards CS-104-46.

I hereby announce to my friends and acquaintances in the Gas Industry, my retirement from this industry, with which I have been associated for the past 37 years as founder and President of the

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Since November 30, 1947, when the Superior Meter Co. Inc. (of New York) sold most of its assets to the Superior Meter Co. Inc. (of Delaware), the New York corporation has not been functioning actively but has been in the course of liquidation. It is the intention of its Board of Directors to complete the liquidation and to dissolve the corporation promptly.

Since the sale I have been Chairman of the Board of Directors of the (Delaware) Superior Meter Co. Inc.

I have resigned as Chairman of the Delaware corporation and am no longer financially interested, directly or indirectly, in its affairs.

I thank the industry for the support they have given to me over the years and ask, for the Superior Meter Co. Inc. (of Delaware), their continued patronage.

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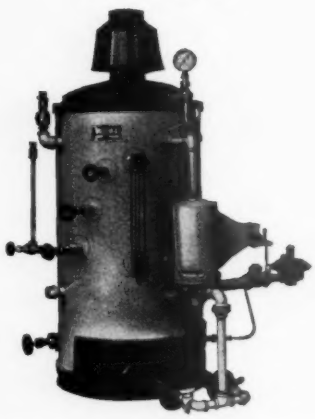

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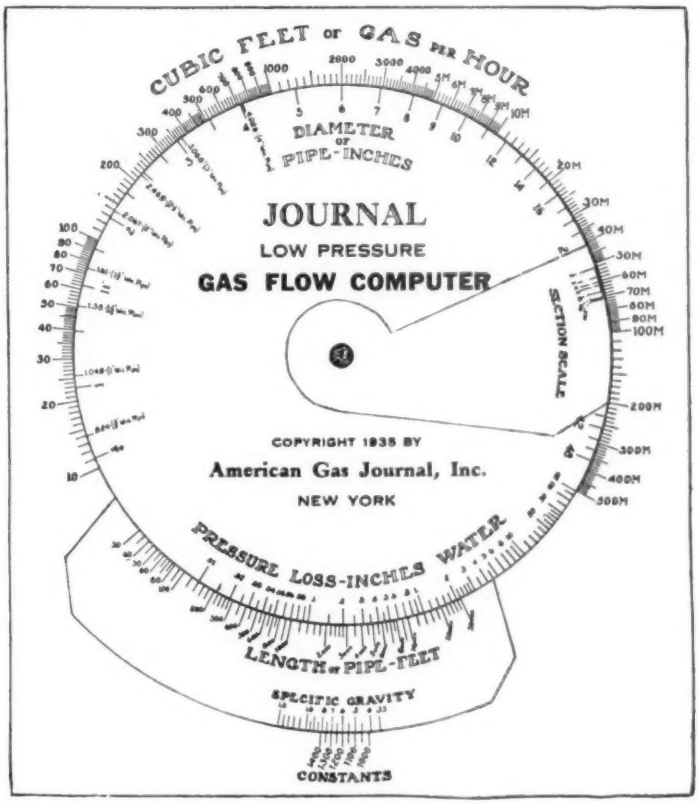

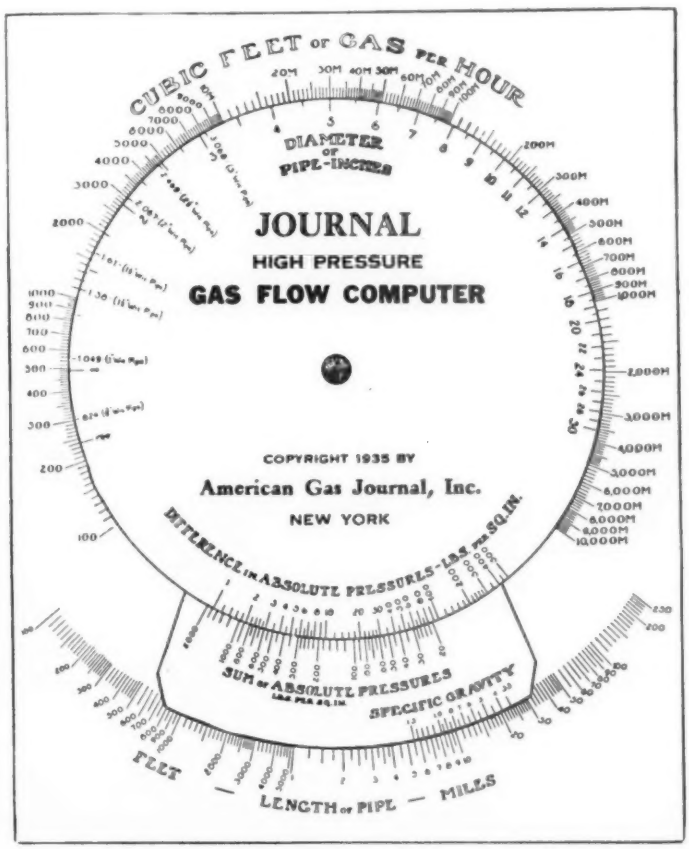

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Pipe diameters	¾" to 48"
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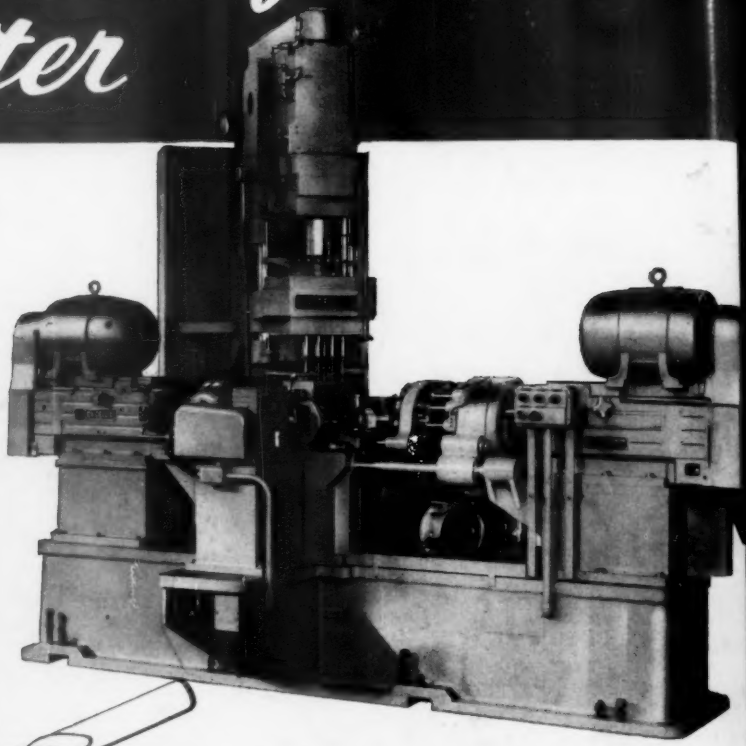
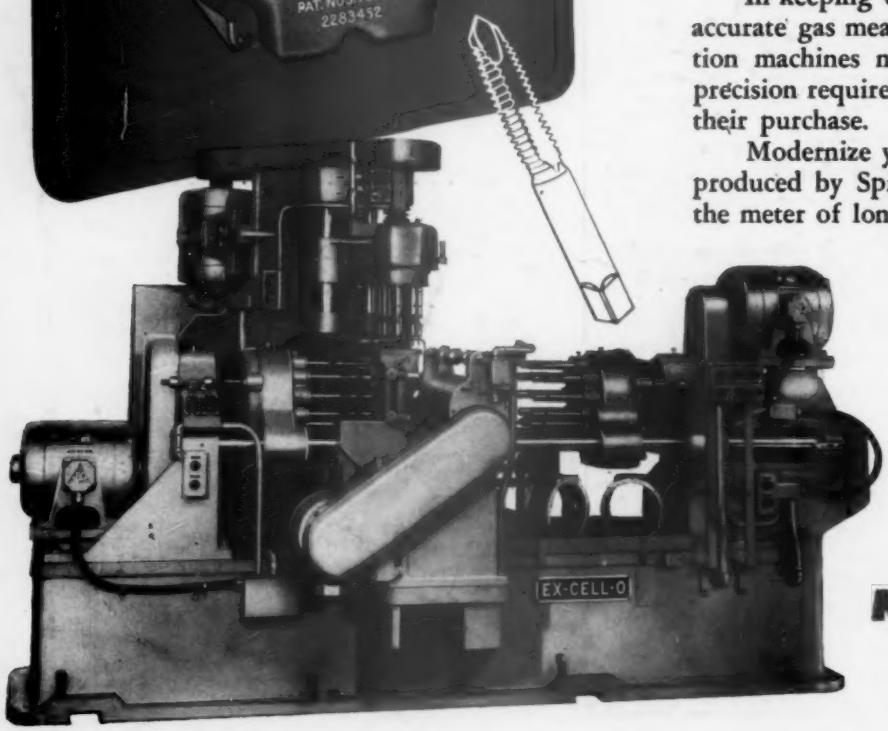
Modern Methods for the Modern Meter





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